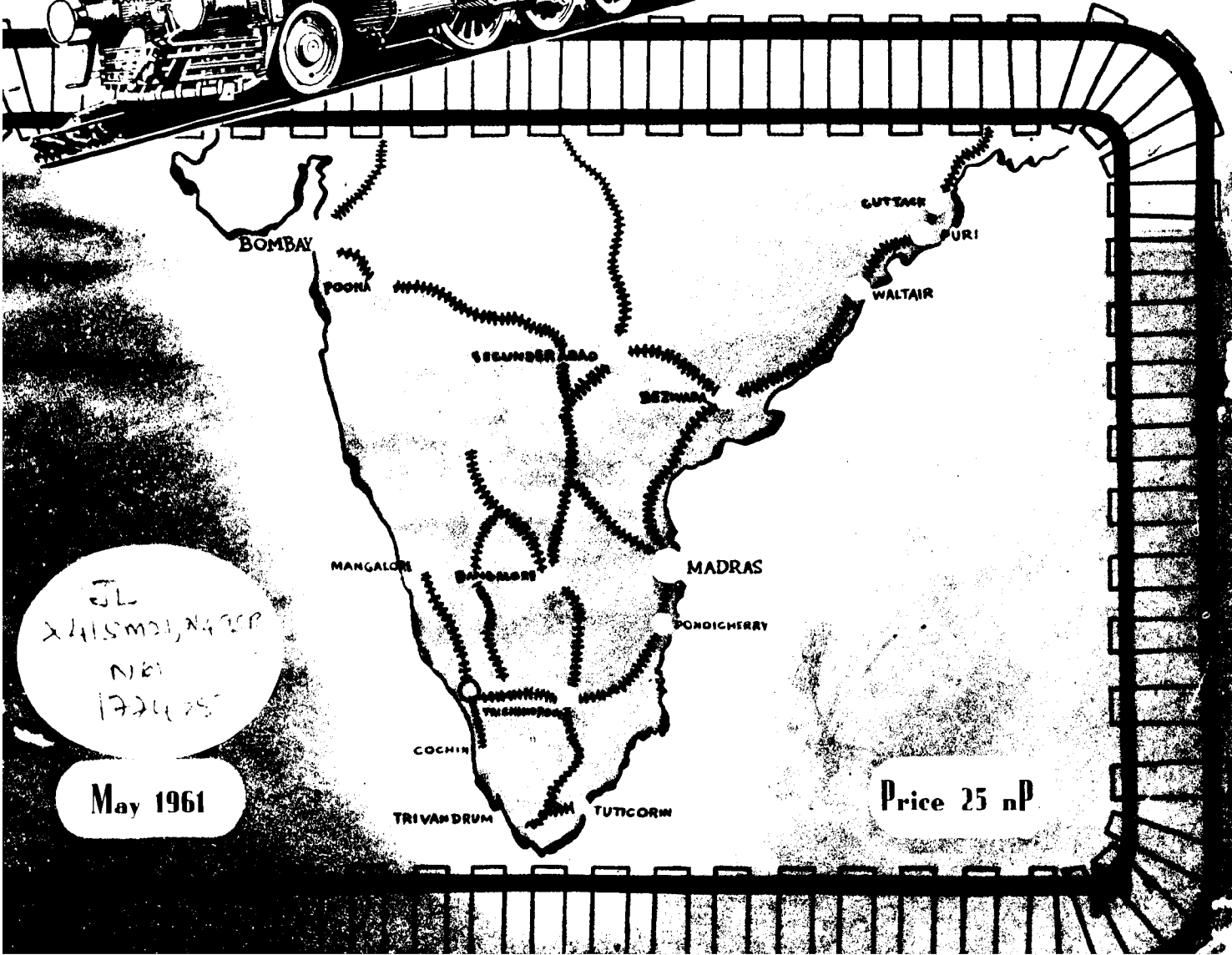
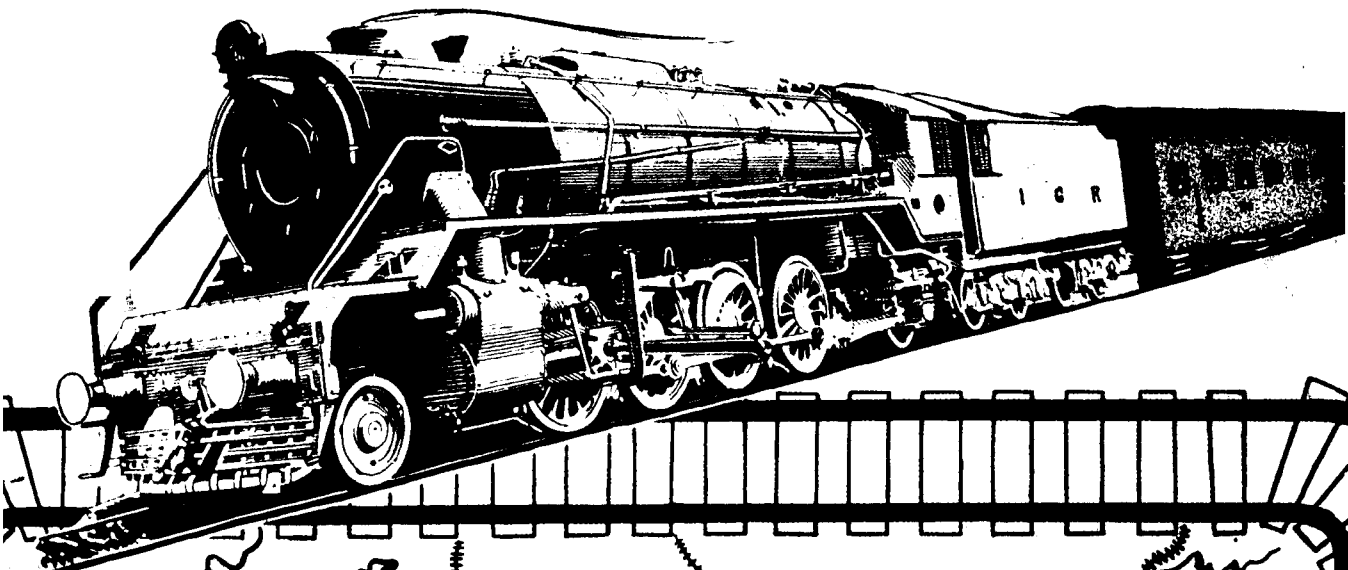


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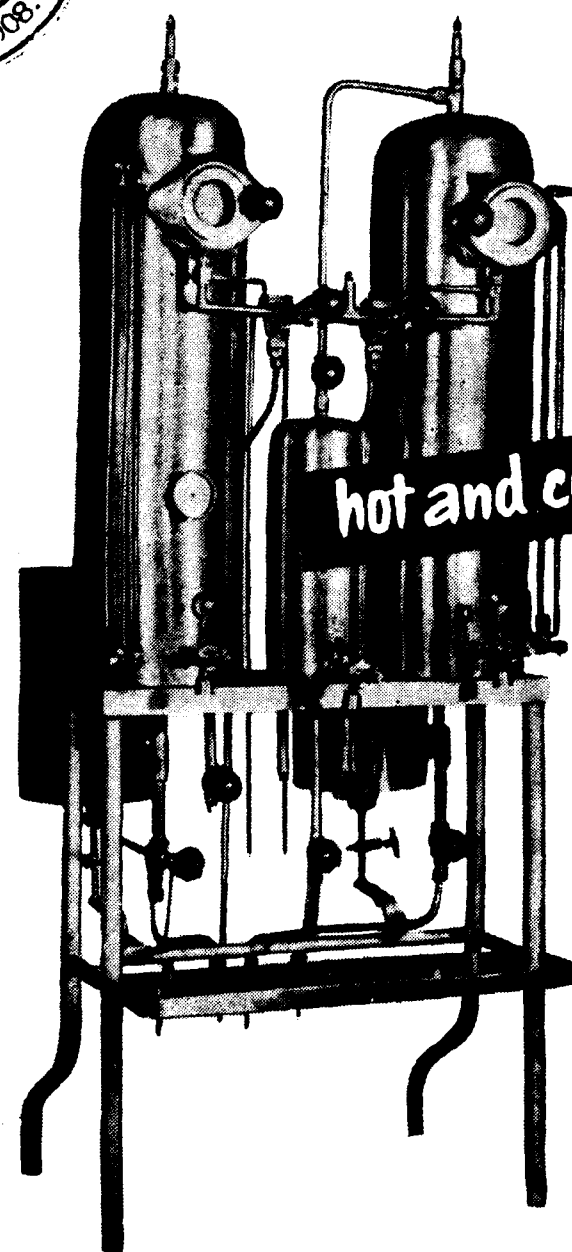
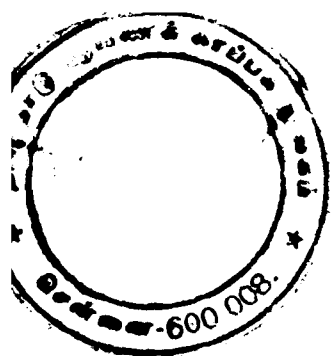
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Railways and their Medical Departments

ONE of the important problems which the Railways have to face is to keep their staff fully employed as long as possible. Absenteeism on Railways quite often poses a serious problem as far as workshop and line staff is concerned, and many a rupee of the Railway is lost due to men being away from their work for long periods and yet getting paid ostensibly on medical leave.

Every big organisation whether it be in the private or public sector is in duty bound to look after the health of the people who work for it and by judicious medical treatment reduce to a minimum absenteeism due to sickness.

The Railways Medical Department can be separated into three Main Sections viz: Medicine, Surgery and Public Health, and it is essential that each of these should function at the top level of efficiency to avoid unnecessary frittering away of the railway's financial resources.

As in most departments a high level of efficiency can only prevail if the majority of staff is dedicated to its service, and works night and day to establish a reputation for efficiency.

Starting at the Administrative level, it is very necessary that the P. H. and H. O. should in addition to being a good medical man, should also be a man of broad vision and well read in his special science. It is he who generally sets the pace for improvements and expansions. The railways are usually a law into themselves and it is he who does all the planning to ensure future development on right lines. He must therefore be well read not only in his medicine and surgery but also in all that makes for advancement and modernisation in hospital techniques and public health matters.

The bulk of the medical work on railways is divided between medicine and surgery on the one side and public health on the other. Though in the early stages of his career a railway doctor has to work both as a physician and a minor surgeon, with the passing of years and in rising to higher grades he specialises in one branch or the other.

It is important that the physician should keep himself abreast of his subject by a vast amount of reading, because from day to day the medical science advances so rapidly. Undoubtedly he is kept up to date with his knowledge of drugs for various diseases by the various drug houses and pharmaceutical laboratories who send him their literature at regular intervals, like in all sciences the physician has to be constantly improving his diagnostic ability and this comes from sound common sense and observations of signs and symptoms and their application for the treatment of the disease. A railway physician has ample scope to practise and

improve his skill because being in a field where senior men and specialists are not readily available he has to rely largely on himself, which is all to the good. It is said that we learn from our mistakes and this is nowhere better exemplified than in the case of a young railway doctor straight out of a college or a interimship in a hospital to take charge of a post as a medical assistant in a small railway district. He has this advantage that he is not kept too long in one district, but moved to others at regular intervals. As he attains seniority in service he is stationed at the larger and more important stations of the Railway and by this time he has gathered a fund of information both of railway working and his own particular subject so that if he has any love and interest in his medicine he will have acquired the necessary experience to inspire confidence in his patient and make a name for himself.

The Surgeon on the other hand joins the Railway Medical Service with a high degree in Surgery and is usually attached to a hospital first as a junior surgeon and then Surgeon in Charge. At first his job is to undertake the minor operations and assist his senior in the operation theatre in the major ones. With a fair amount of practice and a vast amount of reading he develops the necessary skill to tackle most operations. Only in the case of brain or heart surgery will he have to call in the services of a specialist.

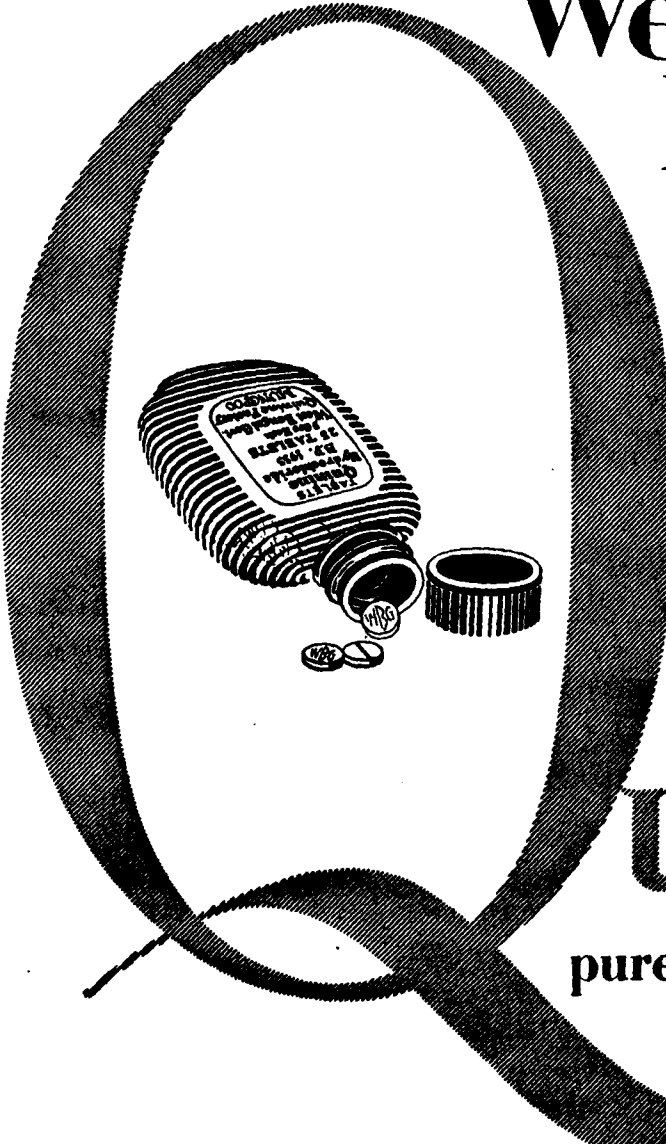
One of the most important functions of a Railway Surgeon is the saving of life and limb in a Railway accident. It is not unusually for railways to have major accidents either by derailments or collisions, and it is here that the surgeon can do a considerable amount of good work and by undertaking amputations of limbs to save lives etc.

The other major department of the medical services of a railway is the health department. The Assistant Medical Officer in addition to his minimum professional qualifications in medicine and surgery joins the service with a diploma in public health or is encouraged to acquire one at the earliest opportunity. It is his special function to be constantly vigilant to prevent an epidemic in his district. He has therefore to be constantly checking the water supply and the sanitation and the cleanliness of the railway colonies where a large number of workmen are concentrated. He has to devise ways and means of adequately disposing of the garbage and night soil.

His greatest role is displayed in meeting the sanitary conditions at fairs and melas where thousands and thousands of pilgrims have to be catered for a short period while the various ceremonies last. By the time he attends a few of these mass gatherings of humanity he becomes quite an expert and can be relied upon to take all the necessary precautions to prevent epidemics.

In all cases of health as well as medicine the knowledge and treatment of Tropical Diseases is very necessary and as far as possible railway doctors should be encouraged to take a course at the School of Tropical Medicine at Calcutta and elsewhere.

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It would be in the interest of the railways to offer inducements to the medical and surgical staff to go abroad on study leave and acquire the latest knowledge technique and skill in their chosen profession. It is only by such encouragement that the railway medical services can be kept up to date.

Dentistry is a minor service on the railways and should be introduced where it does not exist, with nearly a lakh of railway servants scattered all over the railway the services of a dentist becomes a boon to many railway employees who for various reasons cannot leave their stations just to attend to their teeth.

With the rapid advance that is taking place in medicine and surgery, there is more and more scope for specialists, and therefore arrangements should be initiated in the railway medical service that the patient has access to the specialist at railway cost. Just as in big public hospitals of cities and towns specialists give their services in an honorary capacity so too they should be attached as Honorary Specialists to Railway Hospitals.

Every railway should be provided with Emergency Medical Vans which are completely equipped with an operation theatre and all the paraphernalia required to attend to passengers who are the victims of a major railway accident, with such a van transferred to the scene of the accident at the quickest possible time, it may be the means of saving many lives and limbs.

Nearly as important as the medical service of a railway is its Nursing Services and every means should be taken to keep it at a high standard of efficiency. Well trained and experienced nurses only should be employed.

It is a function of the railway medical services to encourage First Aid among the staff and from First Aid to establish an Ambulance Division, and by inter-divisional competitions to keep it at a high state of efficiency.

There is always room for improvement in the railway medical service, even the best, and the Administration should see to it that it functions at a high standard of efficiency always.

9,000 SCIENTISTS IN UZBEKISTAN

The Near and Middle East's only institute of nuclear physics is located in the Uzbek capital of Tashkent. Altogether the Republic has 117 research institutes covering all the industries of Uzbekistan. The more than 9,000 scientists of the Republic deal with such branches as plant growing, geology, hydraulic engineering, astronomy, physics, chemistry and

medicine, to mention a few. They are doing much to promote the peaceful uses of atomic energy, for which purpose an atomic reactor has been started. The Uzbek Academy of Sciences alone has 38 scientific establishments on whose staff there are 1,000 Doctors and Masters of Sciences, mostly Uzbeks, a number of whom are women.

HOSPITALS ON THE SOUTH EASTERN RAILWAY



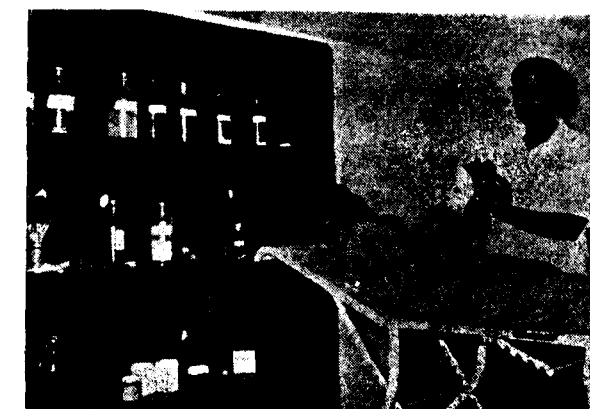
A view of the Railway Hospital, recently opened at Tatanagar.



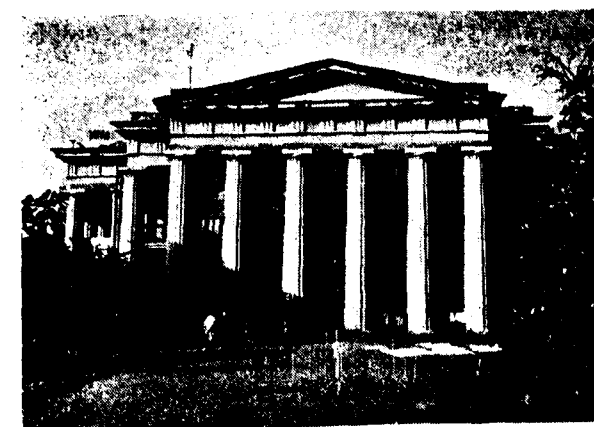
An operation being performed in the Railway Hospital, Khargpur.



New Dispensary opened at Naupada, on the Howrah—Waltair section.



Dressing of wounds in the new Tatanagar Hospital.

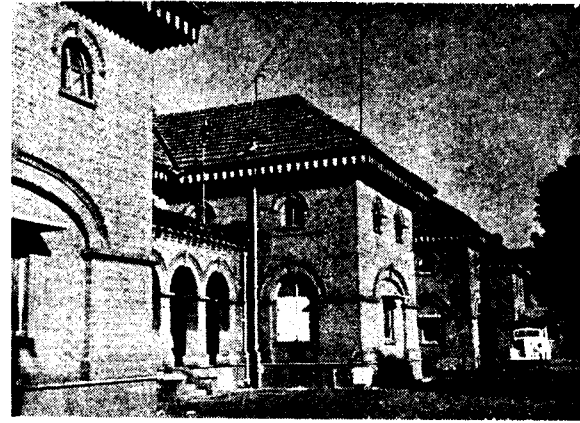


An exterior view of the Railway Hospital at Garden Reach. This majestic building was once the residence of the Railway's General Manager.

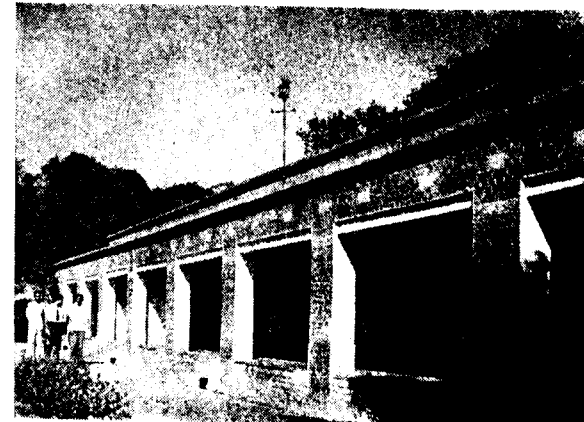


Interior view of the new Maternity Block in the Railway Hospital at Khargpur.

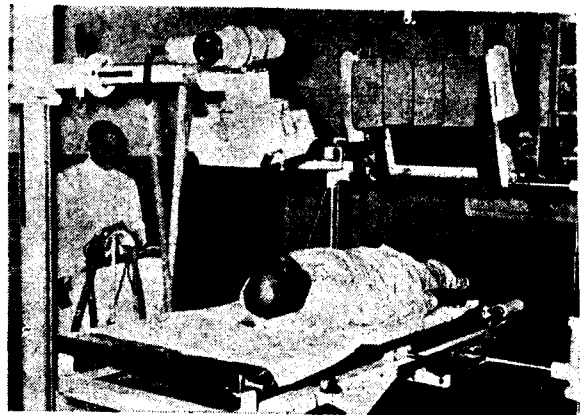
NORTHERN RAILWAY HOSPITAL, ALLAHABAD



Indoor Wards.



Cottage Wards.



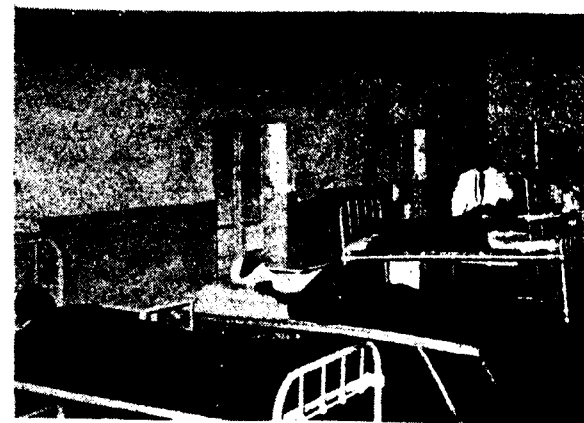
X-Ray Department.



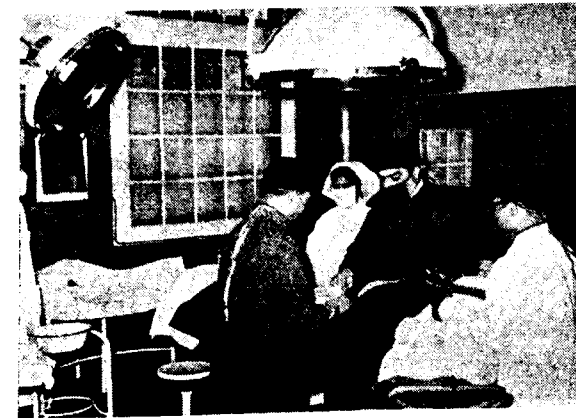
Medical Male Ward.



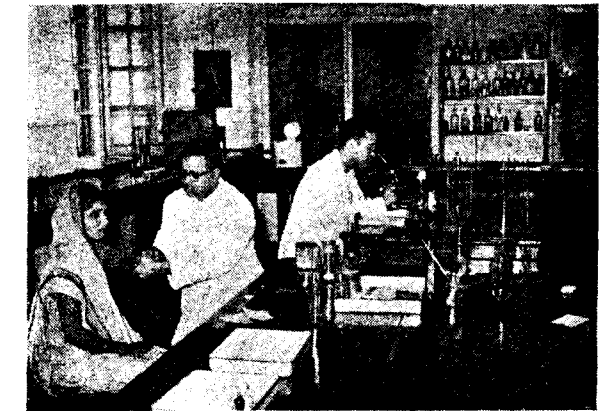
Out-Patients Department.



Surgical Male Ward.



*Operation Theatre
(Operation in Progress)*



Pathology Laboratory.



Patients' Recreation Room.



Queue before Dispensing Window.



Chemical Laboratory.



*Queue before Doctor's Examination Room
Out-Patients' Department.*

*Labour Theatre.**Dental Clinic.**Maternity Ward.**Plaster Room.*

Soviet Doctors to take part in Anti-Polio Vaccination in Andhra

Soviet doctors, now working at the Kalavati Saran Scientific-Practical Pediatrics Centre in Delhi, will take part in anti-polio vaccination in Andhra Pradesh, Mikhail Nikitin, the Deputy Minister of Public Health of the USSR, told a TASS Correspondent. The Soviet Government presented as a gift to the Ministry of Health of India 100,000 doses of anti-polio vaccine which has already been delivered in Delhi. Mr. Karmarkar, India's Minister of Health, conveyed hearty gratitude to the Government of the USSR for this friendly assistance.

Recently, Nikitin went on to say, the USSR shipped to Afghanistan 1,000 litres each of anti-cholera

bacteriophage and anti-cholera vaccine for preventive treatment. The Ministry of Health of Afghanistan is organizing special teams to vaccinate the population of various parts of the country with these preparations. Nikitin recalled that Soviet doctors took an active part in preventing a cholera epidemic in Afghanistan last year.

In recent years, he said, the Soviet Union also assisted Pakistan's and Iraq's health agencies in combating small-pox and cholera. The Soviet Union, Mikhail Nikitin emphasized, has always favourably considered requests for assistance in preventing and wiping out various epidemic diseases.

THE ATOM SERVES MEDICINE

With every coming year man finds ever more uses for the atom. It is becoming indispensable in the treatment of many diseases. The atom standing guard of man's health—this is one more proof of the humanism of Soviet people.

The collaboration of medical specialists and engineers has become unprecedentedly close these days. Evidence of this is furnished by countless medical apparatus and instruments built in clinics and laboratories. Some of them can be seen at an exhibition which has opened recently at the Medical Instruments and Equipment Research Institute in Moscow.

Many of the exhibits are instruments using atomic energy for medical purposes, such as the introduction of minimum doses of radioactive isotopes into the organism.

Cancer, one of the most dangerous diseases, is very difficult to cure and still more difficult to diagnose. Here the atom comes to the aid. The "DSU-60," an automatic diagnosing apparatus, copes with this

task easily, quickly determining the stage of the disease.

There is an instrument, also using atomic energy, for early detection of malignant tumours in internal organs. It registers the rays of isotopes of radioactive phosphorous which accumulates in tumours after being introduced into the body.

The "ST-60," also called a gamma-topograph, is designed for examining the human body as a whole and detecting tumours in the process.

An apparatus inducing artificial cough will be used for curing lung diseases.

There are many visitors in the optical department of the exhibition. New anaesthetising apparatus and instruments for treating sciatica, radiculitis and other ailments with the help of ultra-sound are also widely represented.

Many of the instruments and apparatus on display, all of which were designed in 1960, have already been turned over to industry.

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Technique of Medical Record-Keeping Introduced in Trivandrum Hospital

By Varkey Cherian

TRIVANDRUM—What looks like a filing room in the vast Medical College Hospital in Trivandrum is proving to be a vital aid to teaching and research and also to the treatment of patients.

Wooden racks running the length and breadth of the room support stacks of large manila envelops which contain the case histories of all the patients admitted to the hospital. An efficient system of indexing enables any particular case to be taken out readily for reference after any length of time. The case can be easily located through the name of the patient or his disease.

Though this system of keeping medical records for easy access was only introduced a few months ago, it has already proved to be popular with the staff and students of the hospital.

According to the organiser of the scheme, Mrs. Margaret M. Acker, the purpose of the medical records library is to have a central filing place for every patient and to make that record available for any purpose.

Mrs. Acker, who is a trained American medical records librarian, arrived in Trivandrum ten months ago to organise such a library. Her services have been furnished to the Trivandrum hospital by the United States government through the U. S. Technical Co-operation Mission to India. The Trivandrum Medical Records Library is the first of its kind to be instituted in a government hospital in this country.

Explaining the different uses of such a central filing system, Mrs. Acker said that it is a good teaching medium. Medical students can walk into the library and get all cases of the incidence of a particular disease in one place. Advanced research on diseases is also facilitated by keeping all records of a particular affliction together.

In the operation of the hospital itself, the library is of use because it helps to check on the patients' care and thus to improve hospital services. And the records even help to allocate beds to patients.

The records can also be used by the patient himself, if he should want to refer to his back history even after the lapse of several years. For legal purposes too, the records will prove to be useful.

Especially in a country like India where the mortality rate is high, proper indices of all diseases and all patients are very important, Mrs. Acker said.

She has received requests from other centres to help institute such libraries because of the success of the Trivandrum Library.

Dr. K. Thangavelu, Principal of the Trivandrum Medical College, who is now on an observation tour of the United States under the sponsorship of the U.S. Technical Co-operation Mission to India, expressed delight with the possibilities of the library.

Two members of the hospital staff, K. Gopinathan Nair and K. Nalinakshan, are now being trained by Mrs. Acker to replace her when her two-year term expires.

Meanwhile Mrs. Acker is also putting to good purpose her fifteen years' experience with U. S. Veterans Administration hospitals in Texas by helping to cope with some of the problems of a busy hospital. For instance, she has helped to devise a system of painted signs in different colours to direct patients to particular departments in the Outpatients Section.

A graduate of the University of Houston, Texas, Mrs. Acker took a one-year course in medical records librarianship at the College of St. Scholastica, Duluth, Minnesota.

Popular Medicine in the U.S.S.R.

By Elena Dorskach

RAW PENICILLIN

A Russian manuscript book of medicine, dating from the 17th century, gives the following curious recipe for the treatment of wounds: "If the wound is deep, take from under your bath-house floor that which grows there like mushroom as white as foam and dry it well in a mild oven. Having dried it, crush it fine, sift it through a sieve and mix it with good vinegar, then seal and steam it in a wine pot, and it will thicken. Smear a little of this on the wound with a feather, from the bottom upwards and not from the top, for it will go ill with the wound if you start smearing from the top. The top will heal first and the bottom not at all".

This actually stands for penicillin in its initial, crude form, for certain species of fungus mould are the raw material for modern penicillin.

I saw a photograph of that page of the medical book in the office of a popular Moscow physician who has studied folk medicines for years. But in the U.S.S.R. the interest in popular recipes and remedies is not confined to individuals.

Besides using the latest achievement of medical science, the clinics in the USSR test and apply many homely medicines which have come down to us from old times. All the recipes, which were current two or three hundred years ago, are of course not suited to medicine of the 20th century. Many of these popular recipes are naive, and at variance with modern ideas of medicine. But scientists who study the experience of popular healers must be able to reject the chaff and extract the valuable and useful grains.

That is just the task which VILAR, the USSR Research Institute of medical plants, is expected to accomplish. In this institute every popular remedy which seems promising is scientifically tested, analysed and studied, first on experimental animals and afterwards in the clinic.

The work of a modern research institute cannot rest solely on the advice of ancient sages. Research founded on the modern development of science forms

the main part of the work of the Institute. But all the recommendations made by simple people are given close attention. The daily post brings in batches of letters from all parts of the U.S.S.R. They are written by persons from different walks of life, who wish to share their knowledge with the scientists. One correspondent may give information on certain herbs that cured him of a grave chronic ailment, another may send in a whole list of recipes inherited from his forebears. Information about plants and their descriptions are filed and carefully studied. Not all the information is scientifically useful, and a great part of it has probably been studied already. But no offer containing something new is ever left unnoticed.

Where do the legends of Russian folklore about "living water" take their source? Perhaps in the knowledge of the healing power of infusions made from medicinal herbs, the secret of which did exist and was handed down from generation to generation.

ROOT OF LIFE

In China ginseng, the "root of life", was believed to possess rejuvenating properties. The belief was not totally groundless, for modern medicine has established that ginseng stimulates the central nervous system and the functions of certain endocrine glands. Russia also has its "root of life". It is called "deer root" and grows in Siberia, at the foot of the Sayan mountains. Botanists call it leuzea. Long before our day, Sayan cattle breeders noticed that, after an exhausting winter when feed was scanty, the reindeer gathered new strength if they found this root in spring pastures. It is for this reason that this herb was called "deer root".

The properties of this root were first studied by the scientists of Tomsk (in Siberia) and in 1950 by the Research Institute of medicinal plants. Research showed that the root contained substances having an influence on the nervous system, similar to the influence exercised by ginseng and in some cases stronger. Extract of leuzea is being produced now for use in medical practice.

(Continued on page H.S.10)

VITAMINS RESEARCH IN U.S.S.R.

By Maria Angarskaya

THE U. S. S. R. Vitamins Research Institute is situated in a quiet Moscow by-street. It conducts scientific research and works on methods of improving the technology and cutting down production costs.

Not long ago plants, fish and some other sea animals were the principal sources of vitamins. Big areas had to be sown to certain crops to procure an insignificant amount of vitamins.

Now the scientists have learned to obtain unlimited quantities of vitamins. By means of a complex transformation of simple and available substances, scientists can reproduce the molecules of vitamins which occur naturally in the leaves of black currants, sweet-briar or the organs of sea animals.

The importance of vitamins to human and animal nutrition is explained by their very name: "Vita" is the Latin for Life, while amin is a chemical compound which includes nitrogen. Not all vitamins contain this element, the chemical structure of some is much more varied, but all are vitally necessary.

Vitamins are a part of enzymes which regulate and accelerate all the biochemical processes in a living organism. Food would be useless if the enzymes did

not convert it into cells or energy sources. However, the vitamins—a part of the enzymes—in most cases are not synthesized in a human organism and therefore must arrive in the organism with food or be added to the ration in their pure form. Otherwise, the metabolism breaks down and grave diseases develop.

More than 20 types of vitamins have been discovered and new ones are continually sought.

VITAMIN OF GROWTH

It has been proved that vitamin A (frequently referred to as the vitamin of growth, which maintains the normal state of the skin and the mucous membrane of the eye) may be obtained not only from whale liver, but also from acetylene, from which various kinds of fibre and plastics are manufactured. The new method has been tested at the experimental plant of the U. S. S. R. Vitamins Institute, and now synthetic vitamin A is commercially produced in our country.

Waste products of the chemical industry have been used to synthesize such a vitamin as the pantothenic acid ("Pantos" is the Greek for omnipresent). The artificial "omnipresent" vitamin has proved to be better than the natural one. It might be mentioned

the skin from burns of various kinds and heals trophic and other ulcers.

Many scientific establishments take an interest in popular medicine. The Leningrad Botanical Institute of the USSR Academy of Sciences, for instance, has been studying the anti-tumour properties of the birch fungus (chaghi) for some years. And, by the way, that fungus was included in an old Russian recipe for longevity. Numerous medicinal plants are being similarly studied in other research institutes and laboratories in the Ukraine, Siberia and the Far East.

(Continued from page H.S.9)

In ancient times aloe was regarded in Russia as a universal cure for all diseases. Modern science has studied and confirmed its healing properties. Many years ago the renowned Russian scientist, Academician Filatov, proposed injections of a sterile preparation of aloe as a stimulant of the normal functions of certain tissues. He discovered that the leaves of this plant, if they are kept in the dark and refrigerated, help to resolve scars and are good for certain skin diseases. Other highly useful properties of the aloe have recently been tested at the Institute. The chemical department of the Institute has prepared an emulsion that protects

that the manufacture of only one gramme of the natural pantothenic acid entails the processing of 100 kg. of ox or ram liver.

SYNTHETIC VITAMINS

Domestic fowl gain in weight rapidly when given the new chemical product. People too need this vitamin which is able to vigorously combat the toxic properties of antibiotics, reducing the possibility of side effects when they are used for medical treatment.

It is a matter of common knowledge that vitamin B₁ is recommended for different nervous disorders. Formerly, tons of grain had to be processed to obtain only several grammes of it. Now, the associates at the Institute have produced its synthetic counterpart from ethylene oxide.

The normal functioning of the eye is impossible without riboflavin—(B₂). It is also necessary in poultry industry. The hens which are given B₂ have a higher egg-laying capacity and grow more rapidly. Until recently the output of this vitamin in our country was limited. The Institute developed this vitamin by a chemical process which has now been introduced at a vitamin factory in Kalinin.

NATURAL PRODUCTION OF VITAMINS

Once the Institute solves the secrets of vitamin synthesis, it does not abandon its production from natural sources. Soviet scientists have achieved great success in this field too. Vitamin crops are grown in different parts of our country: in Krasnodar, near Leningrad and around Chelyabinsk.

A special orchard covering 80 hectares has been laid out at the Central Biological Station of the U. S. S. R. Vitamins Research Institute. This peculiar laboratory is not far from Moscow, and the research associates who work there select the cultivated or wild plants which have the highest vitamin content and develop more valuable varieties by means of crossing.

The Institute works in close contact with industry.

It is in a way the first link in the chain of vitamin production. Its laboratories help to solve production problems that the factories run into. More and more of these factories are starting production. The vitamin combine in Bolokhovo will soon be commissioned and its annual output will be tens of thousands of tons of A, C, B₁, and B₂ vitamins. In 1962 the Belgorod vitamin plant will also be put into operation.

By the end of the Seven-Year Plan vitamin output in our country will grow 6-7 fold.

The use of vitamins in animal husbandry is growing steadily. Vitamins are added in powdered form to mixed feed and as a result the animals gain weight noticeably. Particularly useful in this respect is the PP—nicotinic acid which helps the animals to assimilate the nutritive protein which is found in maize.

ENRICHED FOOD

Vitamins are added to human food as well. Indeed, our daily food does not always contain the necessary amount of vitamins. For instance, there is much vitamin B₁ in bread made of rye, but it is practically absent in white bread. There is a very small content of vitamins in cereals that have been refined, such as rice and millet. Potatoes that have wintered lose their vitamins. In order to see that a person gets the necessary amount of vitamins regularly, it is wise to add them to his regular meals.

Many of our children's institutions—nurseries and kindergartens—as well as some of the dietetic canteens have started this practice. We shall be soon buying bread, sausage, butter, milk, cheese and other products enriched with vitamins.

A traveller setting out on a long voyage will not have to carry large amounts of lemons or vegetables. A small jar with tablets of different colours containing the necessary vitamins will suffice. Vitamins come in handy for sailors in submarines, for jet pilots flying at very high altitudes, or for Antarctic explorers. It is a fair guess that the first space traveller will consider a stock of vitamins as one of his most important necessities.

THE ARTIFICIAL KIDNEY

By Prof. N Lopatkin

TO remove the metabolic products from the human body and maintain the necessary amount of water in it kidneys filter a thousand litres of blood a day. This simple statement gives an idea of the important assignment kidneys perform. Any disruption in these functions severely affects the human body. For one thing, the final products of oxidation are accumulated in the organism, leading to malfunction of other organs and affecting the nervous and cardio-vascular systems.

That is why medical science has been paying so much attention to kidney diseases and their treatment.

Until quite recently the treatment of kidney deficiency was a formidable and, sometimes, an unmanageable task. However, the situation has radically changed in recent years with the advent of what is called the artificial kidney.

The artificial kidney is a complicated apparatus connected to a patient's blood vessels with tubes. Even though it performs the functions of natural kidneys only for a while, this proves sufficient for the treatment of diseases which were thought to be fatal in the past.

SUCCESSFUL EXPERIMENTS

Attempts to artificially relieve the body of harmful substances were made about half a century ago. Experiments were made on animals whose kidneys, initially, were made to function abnormally. The blood of a test animal was then passed through impervious tubular membranes immersed in saline solution. On emerging from the apparatus, the blood, cleaned of the dissolved materials to a considerable degree, was pumped back into the blood system. Free of all poison or harmful salts, the saline solution through the membranes, cleaned the blood of all harmful substances, thus relieving the symptoms resulting from kidney failure and giving a rest to other organs. The "rest" period was used by the body to combat the disease and to mobilize its protective and regenerative forces.

It has been a difficult job to manufacture artificial kidneys, especially the membranes. However, Soviet industry now manufactures high-grade cellophane membranes suitable for efficient filtration. To avoid coagulation while the blood passes through the tubes, anti-clotting substances are added to the blood.

Apart from the membranes and saline solution, the artificial kidney incorporates devices which maintain blood temperature, pump the blood through the tubes and membranes, trap blood clots if formed, catch air bubbles, etc.

The clinical application of the artificial kidney has proved the efficiency of the method.

NEW DESIGNS

At present, a variety of successful artificial kidney designs have been developed in the Soviet Union. One of them, designed by the Institute of Surgical Equipment and Instruments in Moscow, has passed all clinical tests and is now under production. Soon medical establishments in the Soviet Union will be equipped with the artificial kidney.

Currently, a kind of "kidney centre" is functioning in Moscow. At the same time research is being conducted into new methods of treating kidney deficiency at the Blood Transfusion Institute, the 1st Medical College, the Urological Department of the Botkin Hospital and in the Urological clinic of the 2nd Medical College. The artificial kidney has already saved many lives.

The artificial kidney does not supplant the other methods of curing kidney deficiency. This is but a link in the chain of other curative measures.

Both physicians and engineers continue to improve the artificial kidney so as to make it simpler and more efficient. Attempts are being made to extend its use for curing other diseases, such as the waterlogging of the lungs, the brain, etc.

BIOCHEMISTRY IN THE U.S.S.R.

By Sergei Severin

Corresponding Member of the U.S.S.R. Academy of Sciences

EACH time a year ends and a new year begins. People involuntarily look back at the path they have traversed and try to look ahead into the future. Since I am a biochemist it is only natural, therefore, for me to review the progress made in the USSR in this field of knowledge, to dream of its prospects in the near future and probably beyond that.

UNCOORDINATED WORK IN PRE-SOVIET YEARS

But first, I would like to say a few words about the state of biochemistry in Russia before the October Revolution. In those years before the establishment of the Soviet government, this branch of knowledge was poorly organised in the country. Research was conducted only in departments set up at higher educational establishments, chiefly in the departments of medicine at the Universities and also in the Agricultural Academies. There were no special scientific research institutes in our line at that time. One of the very few places where biochemistry sections were opened was the St. Petersburg Institute of Experimental Medicine. It was set up on the initiative of Iven Pavlov, the noted Soviet physiologist, and headed at that time by Marcell Nentsky.

It doesn't mean that pre-revolutionary Russia had made no outstanding contributions to the science of biochemistry. If we should take the period immediately preceding the October Revolution of 1917, we could point to such remarkable scientists as Dmitry Pryanishnikov, Vladimir Palladin, Alexander Danilevsky, Vladimir Gulevich and many others.

Although the Russian biochemists did contribute largely to world science, their researches were uncoordinated. That they sprang up and developed fruitfully was solely due to the exceptional energy and natural gifts of the scientists.

PROGRESS MADE IN PAST FORTY YEARS

Biochemical research work was concentrated in scientific centres which were set up after the Great October Revolution of 1917. The country's first

institute of biochemistry was opened in Moscow in 1921. Another institute was founded in the Ukraine soon afterwards. Still another, set up later, is now a part of the USSR Academy of Medical Sciences. The above-mentioned institutes are well known both in and beyond the Soviet Union. Several new research establishments, tackling problems closely related to biochemistry, have been opened recently in Moscow. They include the Institute of Natural Compounds and the Institute of Physico-Chemical Biology. A considerable number of institutes with numerous biochemical sections and laboratories are working on diverse problems linked with the origin of life, features of the living, and ascertainment of the essence of processes of Vital activity and forms of existence of organisms and their development. Scientific researches are aimed at an analysis of organisms in different stages of evolutionary development and are dedicated to the study of these organisms both in normal and different pathological states.

The progress made in biochemistry in the past 40 years is indeed tremendous. The structure of albumens, which constitute the material foundation of life and stimulate metabolism of ferments and their hormones, has been deciphered in principle. We now have a general picture of the way in which cells, tissue, organs and organisms, both simple and complicated, obtain energy for functional activity. The biochemical mechanisms of metabolism disruption in certain diseases have been established. In each of the above-mentioned problems Soviet science has made generous contributions.

FUTURE PROSPECTS

Soviet science marches on, and I hope that the efforts of our scientists working in the field of biochemistry of micro-organisms and plants will in the next few years lead to the deciphering of the biosynthesis mechanism of many antibiotics and the possibility of controlling their processes of production and transformation. I also hope that the solution will be found to such problems as the circulation of matter in a closed system, as in a space ship cabin, for instance (a vital problem in manned space travel), in increasing

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Soviet Pediatricians in India

By Darshan Singh

THE First All-Asian Congress of Pediatrics met at Vigyan Bhavan, New Delhi, from January 2 to 6.

Held under the distinguished patronage of the Indian Prime Minister, and inaugurated by the Indian President, Dr. Rajendra Prasad, the Congress was jointly sponsored by the Indian Pediatrics Society and the Association of Pediatricians of India. The Congress was attended by 350 delegates and observers from 22 countries. The Soviet Union sent a large group of leading pediatricians to participate in the deliberations of this first gathering of the Asian experts on children's diseases.

The Congress heard and discussed reports on varied branches of pediatrics, ranging from cardiology, diseases of gastro-intestinal and nervous systems to surgery and nutritional disorders. The Soviet pediatricians presented eight reports on the administration of antibiotics, cure of dysentery, rheumatic fever and principles of feeding in early infancy and other allied topics.

The Soviet delegation led by Dr. N. N. Grigorieva, the youthful and spirited Deputy Minister for Health of the Russian Federation, includes among others the members of the Academy of Medical Sciences of the USSR, Prof. O. D. Sokolova-Ponomareva and Prof. A. F. Tur, Prof. A. L. Libov, Prof. N. I. Nisevich and Prof. M. I. Olevsky. The

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the productivity of cultivated plants and the food value of grain, and improving the ways of storing and using grain as well as to many other vital problems.

The prospects are great in the field of biochemistry of humans and animals as well. Further development of the successes scored in the biochemical study of the brain will disclose the nature of many unriddled diseases and point out the way of overcoming them. The deciphering of details of biochemical processes will make it possible to increase the strength of sinews. Disclosure of the natural laws bound with the origin of irregular growth of tissue in cases of malignant tumours will be of great benefit to mankind. When we learn the essence of divergences in the processes of

majority of these soft-spoken, genial healers of sick children are women. This in a way is an index to the composition of medical personnel in the Soviet Union, where women "dominate" the medical profession: three out of every four doctors are women.

The Soviet pediatricians were caught in the whirlwind of multifarious activities from the very time of their arrival in the capital. During these days, they participated in 14 businesslike sessions of the Congress, heard the President of India deliver the inaugural address and acclaim this first Asian attempt at collaboration in the field of child care, attended receptions, witnessed a graceful Bharat Natyam performance by Indrani Rehman, which fascinated them, and made their first acquaintance with Indian instrumental music. After the conclusion of the Congress, they will visit various parts of the country, acquaint themselves with the working of the pediatric institutions, participate in symposiums in Calcutta and Bombay, visit new construction sites and seen monuments of ancient Indian culture.

Soviet specialists in children's diseases represent a great fund of rich and ripe experience. There was a time when the Soviet Union did not have a sufficient number of pediatricians to cope with the problem of ridding her large child population of disease. The vastness of the country only added to the difficulties in meeting this task.

nutrition and respiration of the heart muscles and vascular walls then it will be possible to protect human beings from cardio-vascular diseases and to suggest ways of restoring normal cardiac activity.

All these problems, naturally, constitute but a small percentage of the full range of problems awaiting detailed investigation. They are being elaborated in all countries and should lead to a healthier, happier, longer life of man. This is the goal of the Soviet Union which has embarked on the road of comprehensive construction of a communist society. I am sure that the Soviet scientists will contribute their share in solving the vital problems facing world science.

Fighting Cancer in the U.S.S.R.

By M. Mirsky

MALIGNANT tumours carry away millions of lives all over the world. Measures against this formidable disease are carried out in the USSR according to a single comprehensive plan.

Acting on the principle that prevention is better than cure mass preventive examinations are given special attention in the Soviet Union, to enable physicians to discover malignant tumours at an early stage and the presence of pre-cancerous diseases.

The number of cases of advanced forms of cancer has greatly diminished thanks to these examinations. There are persons who were cured of cancer many years ago and are still in good health.

Soviet physicians use various methods of diagnosing cancer. Fluorography, for example, is frequently applied in mass examinations. In this case X-ray picture is obtained on an ordinary photographic film. Special X-ray examinations also yield good results; with the aid of the latest contrasting substances physicians penetrate into the innermost parts of the human organism, examine the structure and location of tumours and reproduce them on roentgenograms. Various laboratory methods of cancer diagnosis, including the examination of sections of tissue under the microscope, are successfully applied in many clinics and hospitals.

Surgeons have obtained great results by working out and applying methods of radical treatment of malignant tumours. In Soviet hospitals the methods proposed by the well-known Siberian surgeon, Professor A. Savinykh and the Gorky surgeon, Professor E. Berezov are applied in operations for cancer of the stomach. The operation for cancer of the oesophagus proposed by Professors B. Petrovsky and S. Yudin is broadly practiced. The eminent

Soviet surgeons, Academician A. Bakulev of Moscow and Professor P. Kuprian of Leningrad, operate in cases of cancer of the lungs.

Many Soviet physicians adopt the electro-surgical method, to avoid great loss of blood during operations. This is a reliable guarantee against repeated cancer.

IMPORTANT TASK

Radial treatment is applied in Soviet medicine to an ever increasing extent. The energy from the split atom relieves people of malignant tumours. Thanks to their cooperation with physicists, physicians can use a wide spectrum of radial energy; from soft radiation, or grenz rays, to superhard high energy rays. X-ray and radial therapy and the radioactive isotopes of gold, cobalt, iodine and phosphorus have proved effective means against cancer.

Soviet pharmacologists have contributed much to the fight against cancer. The chemotherapeutic preparations made by them, including embochin, novoembochin, dosan, tio-tef, sarcolysin, omain and Gordeev's liquid, yield good results in the treatment of cancer of the skin and of some internal organs, as well as various tumours of the blood vessels and conjunctive tissue. The combination of drugs, surgery and radial treatment yields satisfactory results.

To further develop the medical services and health protection of the population of the USSR, research establishments now concentrate their attention on immediate problems of public health. Discovery of the origins of cancer and other malignant tumours and the development of measures for their prevention and effective treatment are important items in this task.

STEROIDS SAFE IN CONTINUOUS USE AGAINST ALLERGIC DISEASES

A North American physician has reported that continuous use of corticosteroids to relieve the discomforting symptoms of allergies can be both safe and effective.

Dr. Emanuel Schwartz, chief of the allergy clinic at the Long Island College Hospital in Brooklyn, New York, reported to a recent medical society meeting on the long-range treatment of 50 patients with severe allergic ailments.

Unlike many physicians who use the corticosteroids only for a brief time, Dr. Schwartz prescribed continuous use of the drugs.

He said he decided upon a continuous, long-term steroid therapy because his patients had failed to respond to previous treatments and were in immediate need of relief. Length of treatment ranged from two years to nine years with the mean period of 4.7 years.

"The results," he reported, "far surpass those previously obtained with any other agent or procedure."

Dr. Schwartz began his treatment with the original cortisone developed in 1949 and as new chemical variations were introduced, he added them to the program. He said that satisfactory relief was reported by more than 80 per cent of the patients treated with the newer compounds.

Among the newer compounds used by Dr. Schwartz was Lederort triamcinolone, developed in Cyanamid International's Lederle Laboratories.

In an article in the *New York State Journal of Medicine* titled "Triamcinolone Therapy in Chronic Bronchial Asthma," Dr. Schwartz reported that the therapeutic response was favourable in all 50 cases and that the response in 46 of the cases could be rated as good to excellent.

He reported 16 instances of side effects, but said that in no instance were the side effects severe enough to warrant diminution or cessation of the treatment.

Lederort was developed by Cyanamid researchers in 1958 as an anti-inflammatory agent for use in the treatment of rheumatoid arthritis, acute bursitis, respiratory allergy, allergic skin diseases and similar conditions.

Lederle scientists recommend it only as a supplement to other forms of treatment since the drug does not remove the cause of the ailment, but only relieves some of its discomforting effects.

It most cases, they say, use of the steroids provides needed relief while the attending physician diagnoses the cause of the ailment and seeks a cure.

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The first pediatric faculty in Soviet Union was opened in 1930. Now there are 27 such faculties in various medical colleges. Besides, there is the Pediatrics Institute in Leningrad. Every year about 3,500 pediatricians graduate from these institutes.

The number of pediatricians has been registering a continuous increase. From 19,358 in 1940, it increased to 54,969 in 1959.

Pediatricians form a big chunk of the vast body of Soviet doctors. In 1959, every sixth or seventh doctor in the Soviet Union was a child expert. And in 1965, the final year of the Soviet Seven-Year Plan, every fifth member of the much increased number of physicians will be a pediatrician.

The result of these efforts for training child specialists coupled with vigorous measures for child welfare is that the Soviet doctors have been able to eradicate many diseases and to drastically reduce the incidence of others. For example, during the last two years, there has not been a single case of diph-

theria in Leningrad and 70 other big Soviet cities. The success has been even more marked in the Soviet Asian Republics.

As the Union Minister for Health, Mr. Karmarkar reported to the Congress there are 150 million children in India and their number is annually augmented by millions of new-comers. Here too the consciousness of the need for child care has tremendously increased. During the first and second plan periods institutions for pediatric training have been opened in 25 of the 50 medical colleges and special post-graduate institutions have been established for teaching and research in pediatrics. With redoubled efforts for child care the infant mortality rate of 146, in 1947, has been reduced to less than 100, in 1959. But as Dr. Rajendra Prasad told the Congress, the country has yet to take a big leap and she has taken in hand an ambitious plan of child welfare.

This opens up broad vistas of mutual collaboration and exchange of experience between the Indian and Soviet pediatricians.

THE FIGHT AGAINST POLIO WILL BE WON

By Academician Mikhail Chumakov

Director of the Institute for Poliomyelitis Research.

POLIOMYELITIS is a severe and dangerous disease. The most tragic thing about it is that it is difficult to detect in its early stages, and when it becomes quite obvious and the patient is fully paralyzed the disease is hard to cure.

Polio sets in insidiously, often masquerading as flu, and the true picture of the disease is only revealed when the virus has already penetrated into the nerve cells of the spinal cord and is beginning to destroy them.

Though poliomyelitis was known for many years as infantile paralysis, it can affect people of any age. It is true however, that children are most susceptible to infection. Polio frequently leaves the patient crippled for life, with distorted hands and feet and so lame that he needs crutches.

Until recently polio occurred very rarely in our country.

SCIENTISTS ON THE OFFENSIVE

As soon as the incidence of polio increased, the Government directed the efforts of many medical men to study of the most effective methods of mass prophylaxis and treatment.

Institutes and laboratories for the study of polio and the manufacture of remedies against it were set up in Moscow Leningrad and Sverdlovsk.

Though we started working on the problem a relatively short while ago mass vaccination is carried out in our country, and in this respect we set an example to other countries where the fight against polio started much earlier.

For a long time all the attempts of evolving methods for the detection of the pathogenic agent and the prevention of the disease had failed. It was clear that the disease was infectious, but the methods that existed at the time were insufficient to study its origin.

It was only by means of the electronic microscope that it became possible to find the pathogenic agent of polio—a filtrable virus. The virus was studied and photographed. It was found to have a size of 12-25 millionth of a millimetre. This is one of the smallest viruses known. Properly speaking there are three distinct types of polio virus, but their "habits" are the same: the virus keeps well at low temperatures (below zero), but does not resist heat. Therefore it can be killed by boiling or warming up to a temperature of over 50°C. Potassium permanganate and calcium hypochlorite solutions weaken the virus, but it is not affected by other substances, such as ether.

TWO PATHS

After methods for cultivating the pathogenic agent of polio had been devised it became possible to start the preparation of prophylactic vaccine. This was done a few years ago by Dr. Jonas E. Salk, an American virologist.

Salk prepared the vaccine from the poliomyelitis virus destroyed with formalin. This vaccine does not always establish immunity, from 20 to 30 per cent of the vaccinated children remaining unprotected. Apart from this, the need to repeat the procedure complicates mass vaccination. It should also be mentioned that the technology of preparing the vaccine from a culture grown on the kidney cells of monkeys and the test of the final product were extremely complex and expensive.

At about the same time Dr. Albert Sabin, another American scientist, completed the study of a vaccine of a different type: the so-called attenuated live vaccine.

Soviet specialists have long been working on the idea that live vaccines are the most effective means of preventing infection. This is borne out by the Soviet vaccines against tularemia and brucellosis.

In 1956 when cases of polio showed an increase in our country, the Ministry of Public Health sent a

group of scientists to the United States to study the work being done by American virologists.

Dr. Albert Sabin gave us a culture of his live vaccine, and this meant the beginning of close co-operation with him. He has visited our country several times.

Over a period of three years we carried out various experiments and repeated tests with the Sabin vaccine and satisfied ourselves that it was quite harmless.

Our scientists were the first in the world to work out the mass production methods for it and they proved the possibility of practically eliminating the incidence of the disease by means of large-scale vaccination campaigns.

We succeeded in this for the first time in 1959 in the Estonian S. S. R. Our Institute evolved a very convenient form of live vaccine coated with chocolate. Mass production has been started.

Various observations of vaccinated children have shown that the immunity acquired by means of the live vaccine is, as a rule, fuller and more lasting than that given by the Salk vaccine—it lasts for at least three years.

There is reason to believe that eventually life-long immunization may be developed, but further work is needed for this.

The conclusions which we reached at our Institute were also supported by Professor Anatoly Smorodintsev in Leningrad and confirmed by the observations of our colleagues in Czechoslovakia.

THE BEGINNING OF VICTORY

Since December 1958, our Institute has prepared over 200 million doses of live vaccine, with which more than 65 million children and young people between two and twenty years of age have been immunized.

In the course of 1960 live vaccine against infantile paralysis will be given to 75 million people in the Soviet Union.

In 1960, following the example of the Soviet Union, the United States—the country where the vaccine first appeared—began to manufacture the live vaccine, as did Canada, Great Britain, Austria and other countries.

Some time ago medical men from 17 countries gathered in Moscow at an international conference at which the results of this major battle against polio were discussed.

If the offensive against infantile paralysis is as large-scale and systematic in other countries as it has been in the Soviet Union, polio will certainly be vanquished and the “crippling disease” will vanish from the face of the earth.

COLOUR TELEVISION IN MEDICINE

The first Soviet colour television installation for medical purposes has been set up in the Moscow Vishnevsky Surgery Institute. Demonstration for doctors and medical students is conducted on two screens 90 × 120 cm. The third screen has been set up in the study of the Institute's Director.

The detection of malignant tumours during an operation is a very intricate matter. Engineers have come to the assistance of the doctors. They have made the tumour irradiate on the screen in diverse purple shades. The surgeon sees the tumour in exactly the same colour. The colouring is extremely natural. The TV installation, so to say, gives the rays the opportunity of penetrating into the very depth of the tissue. It gives a more vivid and deeper

colour than similar American installation and is more convenient in operation.

** ** **

CANCER INSTITUTE IN KIEV

A new research institute of experimental and clinical oncology has been opened in Kiev, the capital of the Ukraine. In co-operation with other Soviet research institutions it will strive to discover the cause of cancer ailment and create new methods for diagnosing and treatment. A special hospital town is being built for the new institute near Kiev. There are several special oncological institutes already functioning in the Soviet Union.



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ARTIFICIAL COOLING AND LIFE

By *Elena Doskach*

Here is the story of a frozen man, without any sign of life, brought back to life. A rare case in the annals of medical science, illustrating the value of artificial cooling for restoring life.

A FROZEN MAN FOUND IN THE FIELDS

AN unusual incident took place in the country's north some time back. A man was brought back to normal life at a small rural hospital in circumstances nearly fantastic to modern medicine. It was hard to believe that this man could live. But he lived all the same.

He had been found frozen in the fields, where he had been caught in a snow-storm. He was brought to the local hospital. His whole body was covered with hoar-frost, and when knocked with a percussion hammer, gave out a wooden sound. A film of ice covered the glassy, staring eyes, with their dilated pupils. The nurses had a hard time cutting and pulling off the clothes. There was neither breathing, nor heartbeat, nor pulse to feel.

After a careful examination, Pavel Abramyan, the chief doctor, made up his mind to save the man. There were chances, he thought. For one thing, nobody knew for how long the man had been frozen. Secondly, it was evident he was young and had 'died' not from disease, but from cold. What was equally clear was that he had 'died' in conditions very close to those of artificial sub-cooling or hypothermy. At normal temperature the time when a dying body can still be restored to normal life is very short—a few minutes after the heart stops beating and breathing ends. However, the time is much longer if the temperature of the body is sharply reduced. Incidentally, this is the reason why recently hypothermy has been widely used as a precautionary measure in heart surgery.

In his monograph "The Resuscitation of the Organism and Artificial Hypothermy"—Professor Negovsky, who has specialised in this line, has devoted a whole chapter to hypothermy. He describes cases when experimental animals were revived an hour after death had been caused by deep narcosis and the

body temperature was kept at 22 to 24 degrees Centigrade. Later, after writing the book, he had experimented with much lower temperatures too. Even what Pavel Abramyan had learnt from the book gave him the courage to make an attempt to save the life of the frozen man.

TWO FACTORS

Two factors could mar the effort. First, the body temperature was too low, and it was not known whether tissues could retain their vitality under such conditions. Secondly, hypothermy calls for narcosis, whether in a clinic or in a laboratory, so that it may not affect the patient's health. But it was hard to say in what condition the man was when he was freezing. It was likely he had not lost consciousness, for his eyes were open.

All the same, the decision was to make an attempt, however hopeless it might seem.

The body was warmed up, rubbed with alcohol and warm water. When the tissues thawed a little, and the body grew less stiff, heart massage and artificial respiration were resorted to. Some 150 cubic centimetres of a donor's blood were injected into the artery, and a dose of glucose dissolved in alcohol into the vein. At first, everything seemed hopeless. All of a sudden, however, when artificial respiration had been applied for forty minutes, there came signs of spontaneous breathing. Five minutes later a very weak pulse could at last be felt. Hot-water bottles were immediately placed around the body, and the physicians redoubled their efforts. Gradually the breathing grew steadier. In an hour and fifty minutes the man was restored to life. But he remained unconscious for a long time still.

Gradually however he recovered consciousness and told of the events which had remained engraved in his memory: the freezing stormy night, the breakdown

of the tractor, how he felt himself grow weak, and desperately desired to remain alive. Then he fell fast asleep.

A special frame was made, with electric bulbs fitted all over it. The warmth thus provided improved the state of the patient. Yet the traumas due to prolonged exposure to cold became more and more apparent. On the second day a very severe pneumonia set in and the patient gave signs of mental disorder.

When he grew stronger he had to undergo an operation: two phalanges had to be amputated from four fingers on the right hand and three on the left.

But the young man was saved. Today—nearly a year since the events described—he is alive, reasonably healthy and can even work.

PROMISING OUTLOOK

This case proves what promise deep cooling or hypothermy holds out for medicine. So far, hypothermy has been widely employed only in surgery. The explanation is simple. It cannot be applied to a dead man, for it takes the physician at least an hour to reduce the body temperature to 24 degrees, while the cells in the cerebral cortex start decaying in just a few minutes after clinical death. The application of hypothermy for the resuscitation of human organs is therefore still in an experimental stage. But the outlook is undoubtedly promising.

What is the basis of resuscitation? Is this basis sufficiently scientific? The answer is definitely, yes. Science has long since proved that some tissues and organs of the human body can stop functioning for a while and then go back to work again.

Scientific investigations concerning anabiosis and hibernation have established that even the living organism as a whole is able to stand a temporary standstill without any harm to its vital functions. An example is the brown Russian bear whose winter sleep lasts from autumn to spring. The sleep is so deep that the bear does not take any food, but it does not die of exhaustion, either. Metabolism continues in its tissues, but so slowly that life practically ceases. As soon as spring comes, the bear wakes up and goes out hunting.

Early in the 20th century P. I. Bakhmetyev, the Russian pioneer of researches into anabiosis, made

intriguing experiments on bats in winter sleep. He froze them down to 4–9 degrees below zero and then warmed them up. The bats would come back to life again. As Bakhmetyev found out, each living organism has its own limit of cooling. For bats the limit is 9 degrees below zero. Cooled more than that, the bat would really die, as its tissues would be beyond restoration.

What about man? Man cannot remain asleep for weeks on end. But when he dies, slowed-down metabolism still continues in his organism, much as it goes on in a dormant or, rather, an anabiotic animal. This is a state in between life and death, and is at any rate, different from biological death, when there is decay of the cells.

As experiments have shown, this state can be prolonged by cooling. But how far can the human body be cooled without damaging the cells of the brain, the most sensitive and susceptible to adverse conditions?

PRACTICAL ASPECT

This question has a practical aspect. Quick cooling applied artificially to preserve the vitality of tissues in the state of clinical death for subsequent resuscitation is only possible with very low temperature. This problem is currently being investigated by Professor Negovsky and his colleagues. The numerous experiments carried out by them have proved that a dog under deep narcosis can be cooled down to 10 or 12 degrees above zero and resuscitated after a period of clinical death of two hours. This is the first time such results have been obtained anywhere in the world. But, probably, they are not the limit. The scientific and practical value of these experiments lies also in that a direct relationship has been established between the time during which the body can be resuscitated, and the degree of cooling. With the body temperature at 24 degrees, a dog can be restored to normal life after it has been in a state of clinical death from half an hour and a half. At 10 to 12 degrees above zero, resuscitation remains possible after two hours. It remains to be seen what is the final limit of resuscitation.

Ours is a remarkable time. What seemed to be sheer fantasy quite recently has become today a scientific problem the key to which is in the hands of man. It may well happen that we shall live to see how the 'dead' will be brought back to life after they have been 'dead' for two or three days.

The Alliance of Medicine and Cybernetics

By *Peter Anokhin, M.D.*

Member of the U.S.S.R. Academy of Medical Sciences, and Andrei Prokhorov,
Engineer, Member of the Bureau of the Presidium of the Learned Council
on Cybernetics of the U.S.S.R. Academy of Sciences

THE solution of modern medical problems would be impossible without the extensive application of the achievements of the technical sciences, of mathematics, physics and chemistry.

The new science of cybernetics has opened up great prospects in this direction. Every day brings fresh news of its penetration to the most different fields of human endeavour. The electronic computing machine which does the work of hundreds and thousands of skilled book-keepers, which indefatigably and unerringly makes the most complicated calculations with hitherto unprecedented accuracy and speed now no longer surprises anybody, just as it follows the "automatic locomotive engineer", the "automatic dispatcher" and automatic traffic "cops" no longer surprise anyone. But what can the machine do in the clinic? How can cybernetics help the doctor or the patient? It appears that here the machine also makes calculations. In particular, it calculates diagnoses. Yes, diagnoses!

CORRECT DIAGNOSIS

Working in close co-operation with mathematicians and engineers, doctors arrived at the conclusion that a diagnosis can be calculated with a certain degree of probability, provided the disease has been sufficiently well studied and the information collected about the patient is accurate. And here electronics comes to the aid of cybernetics, helping to collect this accurate information. The electronic instruments manufactured by our medical-instrument industry are possessed of exceptionally high sensitivity, accuracy, the ability to detect the slightest mechanical, bio-electrical and other changes in the functions of the organism, to intensify them, and convert them into forms convenient for observation and use in a machine for subsequent interpretation.

In recent years such instruments have been produced as the electrocardiograph, the vector—electrocardiograph, electronic devices to record the murmurs and the tones of the heart, the contractions of the cardiac

muscle, the blood pressure in the cavities of the heart and the blood-vessels, the gas composition of the blood, the nature of the respiratory movements. There are electronic devices which record the electric brain waves, electron-optical magnifiers of X-ray pictures, instruments analysing electro-cardiograms, ultrasonic apparatuses for the diagnosis of tumours, and a number of other, no less valuable devices for research and medical treatment.

The idea of utilising the electronic computing machine for diagnoses of heart diseases belongs to Kiev scientists (the Ukrainian SSR). In surgical treatment of diseases of the heart, doctors found themselves confronted with the necessity of accurately establishing the nature of the heart lesions, in order to be able to say with certainty beforehand whether it was possible to perform an operation which held considerable danger for a weakened organism. As a result of three years of joint work of doctors, mathematicians and engineers, the possibility in principle of accurately diagnosing heart diseases with the help of the electronic computing machine was established.

The importance of the researches of the Kiev scientists far exceeds the confines of heart diseases that call for surgical interference. The success of these researches shows that with the help of the electronic computing machine extremely accurate diagnoses of many diseases can be made. The "diagnostic-machine" facilitates the work of the physician, determining the form, type and name of a disease. It only remains for the doctor to take into consideration the individual characteristics of the patient, to make a final decision, and establish the means and methods of treatment.

ARTIFICIAL HEART AND LUNGS

The field of the application of cybernetics in medicine is not limited to diagnosis. These means are of no less importance in modelling different organs to promote a more profound examination. Work in this field has helped to create an artificial heart, artificial lungs and kidneys. These original devices

make it possible to "disconnect" a given organ for the time of an operation, without disturbing the usual conditions in which the organism is accustomed to find itself.

However, cybernetics probably finds its most important application in such fields as the study of the higher nervous activity and the secrets of the human brain. It arms physiologists with absolutely new means and methods of work, permits a new approach to many phenomena and processes occurring in the

human brain, and thus a more rapid and profound knowledge of nature's secrets. In their turn, these researches enrich cybernetics itself, as the laws of control governing living organisms play a very important role when designing automatic control systems in engineering.

Thus, side by side, medicine with its thousand-year old history, and the young science of cybernetics which has not been fully developed yet, enrich each other reciprocally, for the good of man.

ANOTHER POWERFUL ANTIBIOTIC

Nadya Sogulyakina, a student at the Simferopol Pedagogical Institute, lay bedridden for eight months. Doctors were unable to cure her—she was suffering from a general infection of the blood. Then one day a report appeared in the press that the Sverdlovsk Medical Preparation Factory had evolved a drug that might be effective in this case. Nadya's fellow-students

immediately sent a telegram to Sverdlovsk. A small package arrived and a few days later Nadya was walking around the ward. This miracle was wrought by eritromycin, a new antibiotic, which checks all kinds of septic processes, suppurative pleurisy and pneumonia. Many people owe their lives to the medical preparation produced by the Sverdlovsk factory.

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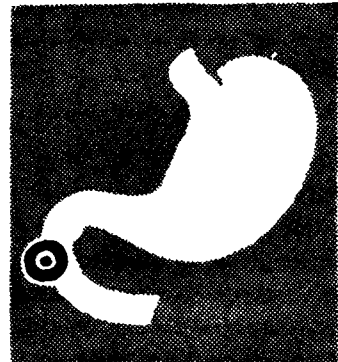
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Medical and Health Care for Chinese Workers

By *Liao Wen-ya*

Ministry of Health, People's Republic of China.

DURING the last eleven years, on the basis of the speedy development of socialist construction, the government of the People's Republic of China has made persistent efforts to improve the labour conditions and eliminate the major occupational diseases of the workers. Thus the medical and health work for Chinese workers has developed very rapidly, the labour conditions and health features in factories, mines and enterprises have greatly improved, and the workers are much healthier than before.

Before liberation Chinese workers were ruthlessly exploited by the imperialists and capitalists. They worked long hours with tremendous physical exertion, and had not the minimum requirements for safety. As to medical facilities for workers, they were pitifully inadequate. Therefore, many workers suffered from one illness or another, and accidents occurred frequently. With life insecure, their health was also seriously impaired. After liberation the People's Republic of China made it a policy to protect the workers' safety and health and stated so in the Constitution. During the last eleven years the various industrial departments of China have worked out many regulations concerning labour protection as well as rules and systems of industrial hygiene. They have also appropriated large funds for the improvement of working conditions and the increase of medical and health facilities in factories and mines. Under the leadership of the Party Committees in the factories and mines, health work in industry has registered great achievements by following the "mass line", the carrying out of the policy of "walking on two legs"—the combination of both Chinese and Western medicine and the use of both indigenous and modern methods—and by adopting various measures for the prevention and cure of diseases.

Particularly since the big leap forward in 1958, the People's Government, according to the type of industry, the number of workers and the different local conditions, has established health departments (bureaus), workers' hospitals, clinics, infirmaries, workshop clinics in all the factories, mines and

enterprises, as well as maternity and children's health centres in the workers' residential sections. In the large enterprises, special organizations staffed with industrial health doctors and nurses have been set up to take charge of the health of workers. These industrial health doctors and nurses are the promoters and organizers of health work in the factories and mines, and in collaboration with other medical personnel and the workers, carry on health work and preventive measures. In addition, the factories, mines and enterprises have trained large numbers of activists in health work among the workers. Scattered everywhere in the factories, mines and enterprises, they are good helpers to the medical staffs. At present, all Chinese workers enjoy free medical care, covered either by the Labour Insurance Regulations or by collective contracts. Meanwhile, to provide beautiful and comfortable surroundings for the proper rest of the aged, the feeble and outstanding workers, sanatoria and rest homes have also been established in famous resorts and large enterprises throughout the country.

The policy of the health work in Chinese factories, mines and enterprises is that everything should be done to promote production, to be closely linked up with production and to serve production. On this point Comrade Chou En-lai made a concrete directive at the Third Plenary Session of the Eighth Central Committee of the Communist Party of China: "Expand the prevention of diseases, and with the hospitals as centres, guide the health and preventive work in the locality and in factories and mines." The medical organizations at different levels and great numbers of medical workers actively responded to the call of the Party and regarded it an honourable political duty to work for the workers' health. In the cities, division of labour according to the classification of the patients, diseases and districts was adopted in medical work. The close collaboration between hospitals and the clinics and health stations in the factories and mines forms a complete network for medical care. In this way we have been able to carry out the policy of early treatment and early prevention. In addition, the medical workers

themselves have put forward the slogan, "Wherever the productive workers are, there will be doctors and nurses in white robes!" They have gone deeply into factories, mines, workshops and construction sites to get a clear picture of the living and working conditions of the workers, so as to be able to improve their medical and preventive work. As a result, they are welcomed and praised by the rank-and-file workers.

In the last few years, the nationwide patriotic health movement centering around the extermination of the "four pests" (flies, mosquitoes, rodents and bedbugs), the observation of public hygiene and the elimination of the major diseases has also served as an impetus to medical and health work in factories, mines and enterprises. The patriotic health movement in factories, mines and enterprises was carried out in accordance with their special conditions, namely, it laid emphasis on the elimination of dust, the lowering of temperatures, the prevention of poisonous elements, diseases and accidents. At present the patriotic health movement is regarded as a regular part of management and included in the production plans. In many factories, the extermination of the four pests and the observation of public hygiene are even regarded as one of the conditions in the competition for outstanding departments or sections. Through this campaign, the conditions of sanitation and health in factories, mines and enterprises have greatly changed for the better, and in many of them production with modern methods and the observation of health and sanitation as a routine have been basically realized. At the same time, the working masses have raised their political consciousness and health knowledge. "To observe public hygiene is an honour and not to do so a disgrace," has become a new social vogue. To clean up before and after each shift to inspect hygienic conditions with the change of shifts are conscientiously practised by the workers.

At present, many key problems on safety and occupational diseases have been solved in the factories, mines and enterprises in China. For instance, in the case of silicosis, a survey has been carried out in many factories and mines, and the incidence of this disease among the workers of different industries and occupations has been found out. Owing to the wide adoption of such measures as wet operations, ventilation, sealing, vacuum cleaning and air filtering, the density of silica dust contained in the air in many factories and mines has fallen below the standard set by the state. In the mines of the metallurgical department, the menace of silica dust has been basically eliminated. Simultaneously with these dust prevention measures, the

health departments have also carried out a general health examination of those workers who work amidst silica dust and given them necessary medical treatment. As the medical workers have liberated their thinking, they have adopted both the Chinese and Western methods for the treatment of silicosis and have gained rather good results. In the elimination of heat prostration, investigations have been made in the last few years in high temperature workshops, and measures have been taken for the lowering of temperature and the supply of proper food and drinks to the workers. At present in the high temperature workshops of most the factories and mines in China, there are ventilation and heat-proof installations as well as protective outfit for workers. Proper drinking-water and work-and-rest systems have been established, and health examinations are made regularly. As a result, heat prostration has become unknown in many regions, factories and mines. In the prevention of occupational poisoning, many medical workers have gone personally into the shops and mines. With the co-operation of the workers, the result has been equally successful. In the case of work accidents, because of the strict observance of labour protection and safety rules and regulations, the number has greatly reduced. It has become a system for the medical workers to visit the workshops and work sites. Wounded workers can get first-aid treatment right on the spot before they go to the hospital, so that they can get well much sooner than before. In addition, the government issued in 1956 "The Provisional Health Standards for the Planning of Industries and Enterprises," requiring all new constructions and expansions of enterprises to abide by these standards. This will make the working conditions in China's factories, mines and enterprises still better than before.

Since liberation Chinese women have become a new force in the building of socialism. The Chinese Communist Party and the People's Government have always paid great attention to labour protection of women workers. According to the characteristics and special conditions of women workers, various measures have been taken for their protection, such as the establishment of the system of special consideration during menstruation, pregnancy, child-birth and nursing periods. For instance, pregnant mothers are transferred to lighter work and are not allowed to do night work so as to avoid fatigue. In factories where there are many women workers, organizations for protecting the health of women and children are generally set up. Doctors and nurses have been trained to carry on propaganda and education for

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mother-and-child care and planned parenthood. Health centres for women workers, rest rooms for pregnant mothers, nursing rooms, creches, special mother-and-child cars (for taking them to and from work) are provided for their convenience. In this way women workers enjoy good health and go to work without any worries. This has greatly increased their labour enthusiasm, so that they can play an even greater part in socialist construction.

The constant improvement in the medical and health work in factories, mines and enterprises has greatly reduced the morbidity among workers. This has not only safeguarded the health of workers but has also powerfully supported production. The workers have well said, "Good health is the

capital of production, and free from sickness is the guarantee for the big leap forward."

At present, under the leadership of the Chinese Communist Party, Chinese workers are enthusiastically engaged in a largescaled mass movement for technical innovations and technical and cultural revolution. Undoubtedly it will greatly enhance China's productive forces and enable China to become rapidly a great socialist country with modern industry, modern agriculture and modern sciences and culture. Along with the development of production, industrial health work in China will also grow more rapidly and more extensively. This will safeguard still better the health of the workers in the building of socialism in our country.

X-RAY MICROSCOPE DESIGNED

A group of researchers of the Machine-building Institute of the USSR Academy of Sciences, led by Professor B. Rovinsky, have designed an X-ray microscope with a magnification of 2,000 times. It is a combination of an X-ray machine and a microscope. The new instrument makes it possible to obtain high-quality enlarged photographs of the interior of various objects.

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Malaria in Soviet Union — A Vanquished Enemy

By E. Doskach

MALARIA has not yet been entirely eliminated in the Soviet Union, but there is no mass infection now in the country. In Tajikistan and Azerbaijan, for instance, some malarial centres still exist. However, Soviet specialists are confident that this disease will be completely eradicated in the nearest future. The extensive experience gained in destroying malaria centres in other republics of the country gives them sufficient ground in pronouncing such a firm forecast. It is not difficult to calculate dates, when the radical method is known.

The method adopted by malaria specialists in the Soviet Union can probably be termed in short, as "combined attack on all fronts." Such an elusive foe as the malarial mosquito requires tactics that have been thoroughly studied.

The Ministry of Public Health is the operative centre of anti-malarial measures for the whole country. And it will be quite interesting to learn all about the tactics it actually applied in this field.

The Soviet Union never applied any chance measures against malaria. Every programme is carefully planned and entirely financed by the state. The annual plans of anti-malaria measures are implemented only after being approved by the Government. And the state assigns every year large sums both for prophylactic measures and medical treatment.

The explanation for these double measures is very simple. If a malaria infected person is not medically treated, for two years—the average life time of the

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malarial plasmodium in a patient's organism—that patient will be an infection carrier.

COMBINED METHODS

The method of mere destroying mosquitoes is rational only if it is possible to wipe them out completely in a large region. If this is not possible, the mosquitoes that remain alive will be a sufficient source of new infection. The method usually yields only temporary results and is very costly. Therefore, the Soviet Union has adopted combined measures in its battle against malaria such as: registration and treatment of malarial patient and destruction of the mosquitoes that are malaria carriers.

By 1952 the USSR had 2,150 anti-malaria stations. The programme is worked out for every inhabited locality, district, territory and region and, finally, for the whole republic. The data sent in by the republics are examined in the Ministry of Public Health, where the general plan of measures against malaria is made up for the entire country. An army of physicians specialised in malaria, aided by medical workers, are grouped into entomological parties that go every spring to the malarial districts. After the malarial centre has been cleared in one republic, these parties, if necessary, go to another republic.

All patients are registered at the malaria stations. The method adopted for this purpose is that as soon as a party of physicians arrives in a new locality, they begin house to house visits and make a medical examination of all the inhabitants. All the victims of malaria are registered and kept under constant medical observation. The treatment is free and the malarial station has enough personnel to visit them daily, at certain hours, to bring them free drugs and see that patients take them in time.

EFFECTIVE TREATMENT

The fact that the anti-malaria establishments supply effective preparations, such as bihumal and quinocide, is of the utmost importance. Bihumal kills the malarial plasmodia in the patient's blood and quinocide destroys the three-day malaria pathogene in the stage of development in the tissues. Thus the two preparations give a radical cure of this form of malaria.

Another measure, besides the treatment of patients, is disinfection, which is conducted in the same locality on a broad scale. It consists, first of all, of the use of strong insecticides, mainly DDT, in all the buildings.

An important prophylactic measure is the destruction of mosquito breeding centres: draining bogged lands, disinfection of water reservoirs, etc. Water reservoirs are disinfected by means of chemical toxins innocuous to man and their surface sprayed with naphta and gambusia—a rapidly multiplying species of fish that feeds on the larvae of malarial mosquitoes—is bred in the water reservoir, etc.

These measures naturally demand ample funds and much labour. The disinfection of buildings is much less costly and destroys the mosquitoes which are the most dangerous carriers of infection. After sucking human blood, the mosquito does not fly very far, but seeks a protected place nearby, where it can calmly digest its food. When the walls of the room are treated with toxin that does not evaporate soon (DDT, for instance), the mosquitoes that settle on them are poisoned and die in the most dangerous stage of their existence.

For that reason Soviet malaria specialists are particularly careful in disinsecting buildings and literally every corner in them. Domestic animals should also be treated with insecticides. This is particularly important in the districts where silk worm breeding is conducted on a big scale and the use of DDT in buildings is very difficult, because that poison is deadly for the silk worm, as well as the mosquito.

The results obtained by the combined methods against malaria are really noteworthy. The Ukraine was considered to be one of the large centres of malaria. There are now no more malarial spots in the Ukraine. Armenia, where only recently the number of malarial patients was very great, now has hardly any.

New progress in combating malaria is achieved every year in the USSR. The number of marks, representing malarial centres on the country's map, is steadily diminishing. The time will soon come when none are left.

PLASTICS AS A HEALING SUBSTANCE

By R. Gordin

A nine year old girl was brought to No. 1 Kishinev City Hospital in a coma, with mortal burns. The interne on duty did all he could to save her, nevertheless the child's condition continued to worsen.

Nikolai Kuznetsov, M. Sc. (Medicine) and head of the Histology Department of the Kishinev Medical Institute, came to the rescue. On examining the girl he recommended treatment with bioplastics and gave to the surgeon several sheets of biological plastics, as thin as tissue paper.

The process of treating burns with biological plastics is very simple: the injured parts are wrapped in sheets of bioplastics. The results of the treatment were excellent: the little girl grew better on the very second day, in the week's time she could smile weakly at the doctor, and in a month she was able to sit up in bed. Healthy skin grew and spread gradually under the layer of bioplastics.

This seemed almost miraculous and surgeon Michael Kaufman decided to apply the new stuff in a wider field and try it on cases of incurable trophic ulcers. The results were most encouraging. For example, a woman aged sixty, who had been suffering from a deep trophic ulcer for eight years and tried every remedy in vain was cured in the course of only two weeks.

Surgeon Kaufman's clinical work is only one link in a long chain of experiments made by Moldavian doctors with various biological plastics elaborated by Kuznetsov. These experiments are not confined to Moldavia and Assistant Professor Kuznetsov receives letters from various Soviet cities almost daily. Some of them tell of clinical experiments, others ask for bioplastic material: films, tubes, catgut, pins, etc.

EVOLUTION OF A UNIVERSAL HEALING SUBSTANCE

Generations of surgeons has dreamt of such material: solid, light, not requiring special storage, easily sterilized and simplifying the technique of

operation; i. e. material that replaces metal, ordinary plastics, natural and synthetic rubber in plastic surgery.

Almost three decades ago Nikolai Kuznetsov, then Assistant in the Department of Histology of the Moscow Medical Institute, studied the serous cover of internal organs and discovered that it consists of strong longitudinal fibre of rather great length. The serous cover of the peritoneum of cows and oxen later became the initial material from which biological plastics were made.

Bioplastics are often called a universal healing substance. Light and strong, bioplastic materials are now universally applied in surgery. Their effect on the organism is similar to that of a catalyser of vital processes, in other words of a biological stimulant. And bioplastics have another very important advantage: after the healing process is over they fully dissolve in the body.

Kuznetsov's plastics are applied on a growing scale. The eminent Russian eye specialist, Professor Ivan Kurlov, noticed that catgut made of bioplastics has a powerful healing influence on the eye tissues. As he later wrote: a complete cure was achieved even in cases where surgery seemed unavoidable and the patient was threatened with complete blindness. A great Soviet scientist, the late Academician Filatov, called the use of bioplastics in surgery "the method of the future".

Surgeon Pyotr Polyakov has developed a new method of treating complicated fractures of the tubular bones with Kuznetsov's bioplastics. Three or four years ago a 19 year-old student of Kagula was threatened with amputation of the arm. By using bioplastics Polyakov saved the youth's arm and completely restored its function.

SOME EXCELLENT RESULTS

Similarly doctor Michael Zagarskikh has had excellent results in the treatment of stenoses of the larynx and upper respiratory tract. Let us look into the case records filed in the archives of doctor

Zagarskikh. Here is the case of a year-old baby who was brought to the clinic where the doctor worked. The child was suffering from post-operational stenosis of the larynx. Although experienced surgeons had operated four times and every possible means was tried, the larynx was gradually narrowing and the child was threatened with death through suffocation.

Zagarskikh undertook to treat the little patient. A tube, made of biological plastics, was introduced in the child's larynx where it remained 25 days, after which the child left the clinic with the breathing and vocal functions of the larynx fully restored.

But this could have been due to the restorative powers of the baby's organism, one may say. Nothing of the kind. Here is another case. This time the new method was tried on a 52-years old patient who was brought to the clinic with a severe scleroma of the larynx. Previously he was operated twice and

had two courses of treatment with streptomycin and X-rays. In spite of all this he was slowly dying of suffocation. It took Zagarskikh only eight days to restore the patient to his normal health.

Preparations made of Kuznetsov's bioplastics have been applied with unvarying success to correct defects of the bilious ducts, in the treatment of hard hearing, restoration of disrupted blood vessels, nerves and liver ducts, traumatic injuries to the hard cortex of the brain, tendons and digestive tract. The Presidium of the Scientific Medical Council of the USSR Ministry of Public Health has passed a resolution favouring the broad use of Kuznetsov's bioplastics in medical practice and publication of the collective works of Kuznetsov and his followers. There are at present about 100 of these works in various fields of medicine. The same resolution proves for the regular output of preparations made from biological plastics, which are already in very great demand.

FOAM PLASTIC IN SURGERY

By Irina Lyadova

At a surgeons' conference held in Kiev last summer a patient was shown whose finger-joint had been made from his own toe-joint. The surgeon had succeeded in lending the new joint flexibility. It was indeed a difficult operation. But in the ancient Russian town of Vladimir, an eminent surgeon, Dr. Mikhail Svirezhev carried out an even more amazing operation. He succeeded in restoring the flexibility of a patient's knee-joint with the aid of a polished foam-plastic tube.

Dr. Svirezhev's achievement aroused great interest and surprise even among experienced surgeons. Synthetic resins and surgery—this was something unusual.

The amazing foam-plastic (polyvinylformal) used in the operation was developed by the scientific workers of the Institute of Synthetic Resins in Vladimir who worked in close co-operation with Moscow neurosurgeons. The new material will be used for plastic operations on the cerebral membrane.

It all began in July 1959, when scientists from the Burdenko Institute of Neurosurgery in Moscow came to Vladimir and requested the scientists of the Institute to develop a foam material which could be used for prosthesis of the brain membrane. The research connected with the production of the new material was entrusted to Yelena Tarakanova, who had recently graduated from the Gorky University.

How was she to begin?

Tarakanova made a careful study of books and articles on chemistry and medicine. In the works of Professor Ushakov she found confirmation of the fact that polyvinyl alcohol was not toxic. "That means that a foam plastic derived from it would also prove to be non-toxic. And that is one of the necessary properties of the required material", thought Tarakanova.

EXPERIMENTS BEGIN

Experiments began. In a month's time already the first laboratory sample of foam-plastic was obtained

and given a long and difficult name: foam-polyvinylformal.

Samples were sent to Moscow. There, the neurosurgeons continued the experiments. It seemed that everything was going well. But suddenly a disturbing message was telegraphed to Vladimir: The dogs which had been operated on were restless and their temperature had risen. Dissection revealed that the prosthetic material had adhered to the brain tissue at points where the foam-plastic was porous.

Yelena Tarakanova came to Moscow in order to be present herself at operations, to study the structure of the natural brain membrane, the technique of suturing the prosthetic material to the tissues.

An amazingly simple way out was found: The surface of the foam-plastic contiguous to the cerebral membrane had to be polished to make it impermeable, while on the side of the skull the plastic had to remain porous.

The results of these neurosurgical experiments proved to be wholly satisfactory. The test animals behaved normally and their temperature did not rise. The surgeons approved the new material.

Soon, many medical institutions began to take an interest in the foam-plastic. It was found that foam-plastic could be used to make artificial esophagi, blood-vessels, lung-tissue etc. In the Kiev Tuberculosis Institute some 30 plastic operations have already been performed with the use of the new material. Blood vessels were replaced in 12 experimental operations, the trachea and bronchi in six operations.

Operations on the lungs are of great practical interest. The surgeon removes a part of an affected lung and fills the cavity thus formed with foam-plastic which is rapidly permeated with connective tissue, which accretes firmly, and does not permit the heart or other adjacent organs to be displaced.

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Soviet Help in Public Health Programmes of Underdeveloped Countries

THE decade and a half since the end of the Second World War will perhaps go down in history as "the years of the Awakened East." In these fifteen odd years, one country after another in Asia and Africa, has put an end to colonial rule and has emerged on the high road to freedom and prosperity.

It was a grim legacy that these newly independent states inherited from their erstwhile rulers. Centuries of foreign domination had left them with low industrial development, with ruined agriculture and with their peoples illiterate, ill-fed and ill housed, a prey to infections and disease.

Since independence these nations have begun to tackle the problem of their economic growth and social upsurge. With great perseverance and with remarkable élan they are engaged in the task of national resurgence, they are making determined efforts to equip themselves with modern industry and agriculture in order to be able to raise the material and cultural standards of their peoples.

The elimination of disease and epidemics and protection of the health of the population have been recognised as a very important aspect of national reconstruction. Towards the fulfilment of this task valuable contribution is being made by the USSR.

HELP TO INDIAN PHARMACEUTICAL INDUSTRY

The Soviet Union is helping the Republic of India in the construction of State enterprises for manufacturing medicines and surgical instruments. As the Minister of Industry in India, Mr. Manubhai Shah, stated on the occasion of signing the agreement, the loan of 95 million rupees from the USSR for this purpose would play a great role in developing an indigenous pharmaceutical industry in the country.

Till recently large quantities of medicines were imported by India, in spite of the fact that the country possesses valuable resources of important medicinal herbs and plants from which medicines are produced.

The credit from the Soviet Government is being used to purchase equipment from Soviet enterprises

and for its assembly in India with the help of Soviet specialists. These specialists will train Indian personnel in all aspects of the technological processes. When the Indo-Soviet project will be completed, in 1963, India will produce antibiotics, synthetic medicinal preparations, vitamins and surgical appliances. This will enable India to use local resources for preparing medicines as a result of which adequate supplies of essential medicines and drugs at reasonable rates will be assured. Moreover, this will save the valuable foreign exchange reserves of the country.

The four plants, projected under this venture, will all be in the public sector, and will be located in different parts of India. One of these plants, the antibiotics plant with the capacity of 300 tons of products every year, will be set up at Rishikesh, Hardwar. The second plant, to manufacture synthetic medicinal preparations and vitamins, will be situated at Hyderabad. Over 3,500 partly finished products—intermediate compounds—of 15 different varieties and 850 tons of 20 different synthetic chemical preparations, will be manufactured here. The phyto-chemical unit in Kerala, with the capacity of 76.4 tons, will manufacture alkaloids, glucosides and other compounds from local plants. The main surgical instruments plants having a total annual capacity of 2.5 million instruments and parts of instruments of the 12 basic instrument groups will be established at Madras. It may be noted in this connexion that the optical glass factory with the annual capacity of 300 tons—the first of its kind in India—is also being built with Soviet aid.

The USSR Red Cross, at the request of the Government of India and the Indian Red Cross, opened a pediatric centre in the Kalavati Saran Children's Hospital at New Delhi.

Apart from providing skilled aid to children, new local pediatricists are trained here and the qualifications of the existing Indian personnel are being raised. This centre has been provided by the USSR Red Cross with the most modern equipment.

Mention may here be made of the good work done in Saurashtra by Dr. O. V. Makeyeva, a Soviet physician sent to India by WHO. She stayed in India

for more than two years; during her stay 120 maternity and child protection centres were opened in Saurashtra. When bidding her farewell from India, the state's Chief Minister paid her a moving tribute: "Dr. Makeyeva is a scientist endowed with a great heart. Everything she has accomplished here evokes admiration."

AID TO AFRO-ASIAN COUNTRIES

Equally valuable aid is being made available to many states of Africa and Asia.

The Soviet Union is building near Cairo a big plant for the manufacture of chemicals and drugs including penicillin and streptomycin. A similar plant is being planned for Iraq. This will have an annual output of 5 to 6 tons of penicillin, streptomycin and biomyacin and a wide range of other medicines.

In 1958 Soviet doctors helped fight cholera and smallpox epidemics in Pakistan; in 1959 they helped combat a smallpox epidemic in Iraq.

The Soviet Union built a 500-bed hospital in Pnom-Penh, the capital of Cambodia, as a gift to the Cambodian people. The hospital is equipped with the latest medical instruments and in order to start its work 18 medical workers were sent from the USSR. A hospital with 200 beds and an out-patient clinic are under construction in Burma. A hospital has been run by Soviet Red Cross in Addis Ababa since 1947 and another in Teheran since 1943. Medical help has been rendered also to Yemen.

PHENOMENAL ACHIEVEMENTS OF SOVIET HEALTH SERVICE

The many urgent and grave problems facing the independent nations of Asia and Africa in tackling the problems of health protection of their peoples were confronted by the new Soviet state when the people of the USSR took power into their own hands in October 1917. And when one looks at the highly efficient, remarkably well-trained and mass-oriented nature of Soviet health services today, one can hardly imagine the magnitude of the task the medical personnel had to face.

Russia, on the eve of the Revolution, was suffering from widespread epidemics. A primitive and inadequate medical service existed for a population with a very high sickness and mortality rate.

All this is now a thing of the past. With medical

aid free for all and working on the principle that "prevention is better than cure," the USSR has attained a very high standard of medical care and health protection. The whole territory of the vast land is covered with a network of bacteriological, sanitary and hygienic laboratories, disinfecting stations and vaccination units.

As a consequence the average life span in the USSR now is 68 years compared to 32 before 1917; infant mortality rate has dropped seven times; infectious diseases like cholera, plague, malaria and small-pox have been practically wiped out. Rarely does typhus occur now, a disease which before 1917 used to take a heavy toll of life. The Soviet Union has now the lowest death rate: 7.2 per ten thousand people a year. This is 4.2 times less than before the Revolution.

EXPANSION OF MEDICAL SERVICES IN USSR

The health services of the Soviet Union will be greatly extended and improved during the course of the Seven-Year Plan (1959-1965). The Plan provides 25,400 million roubles for capital investment for the construction of public health institutions, social maintenance, and medical industry. This is 80 per cent more than in the previous seven years. This will make it possible to double the number of hospital beds by 1965 and increase the accommodation in nurseries by more than 2.5 times, in comparison with the previous seven-year period. The number of children catered to by the kindergartens will increase 1.8 times.

The Soviet medical industry will be further developed in this period. The production of antibiotics and other modern effective curative means will be increased. The production of medical articles will by 1965 increase three times as compared to 1958. The manufacture of antibiotics will increase 3.7 times, of vitamins 6 times, of medical instruments and appliances, including apparatus for the use of atomic energy in medicine, by 2 to 2.5 times.

The successful implementation of these measures will further strengthen the medical services of the USSR. This, coupled with the introduction of the latest achievements of science and technology in Soviet medicine, will enable the Soviet health protection services to render much more valuable help to the medical workers of the African and Asian countries in their noble task of protection of the health of their peoples and contributing to the resurgence and prosperity of their nations.

BETTER TEETH WILL MAKE BETTER INDIA

By Dr. M. A. R. Nathan, L.D.Sc.

TEETH—SYMBOL OF HEALTH AND BEAUTY

DENTISTRY is the science and art of preserving the natural human teeth in a state of health and beauty. The teeth have got also a relationship with the production of voice and the formation of the contour of the face.

The teeth of man are hard masses of calcified tissue

attached to the Mandible and Maxilla for the main purpose of mastication of food.

The normal signs of approaching dentition are :—
(1) Increased flow of saliva (2) Tendency of the child to bite (3) The gums are tense and shining (4) Mouth is hot.

Normal healthy child may erupt its deciduous teeth without the above symptoms. Milk teeth are 20 only. The approximate date of milk teeth eruption and formation are as follows :—

	Eruption Months	Roots completed Months	Absorption begins Years
(a) Central	7	18	4
(b) Lateral	9	15	5
(c) Cuspid	18	22	9
(d) First Molar	12	20	7
(e) Second Molar	24	24	8



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oral
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About the sixth year the milk teeth becomes slightly separated from each other and are pushed forward by the permanent teeth. The females erupt their teeth about 4½ months earlier than the males. The children of well-to-do classes erupt their teeth earlier than the

children of the working classes. The permanent teeth are 32 only. These are the one's which remain till the end of our life. The approximate dates of permanent teeth eruption and formation are as follows :—

	Eruption Years	Roots completed Years
(1) Central incisor	6—8	10
(2) Lateral	8—9	11
(3) Cuspid	10—12	13
(4) First-Bi-cuspid	10—11	12
(5) Second „	11	12
(6) First Molar	6—7	9
(7) Second „	12—13	16
(8) Third „	18—24	20

TO-DAY'S CHILDREN ARE TO-MORROW'S ADULTS

Hygiene of the mouth :—In pre-natal life large amount of carbo-hydrate and calcium should be taken in the early period of pregnancy for the development of the teeth. Outline is given here for the food of the pre-natal period.

(1) Milk (2) Fresh vegetables (3) Fruits (4) Cereals : Wheat Flour, Oats (5) Water-plenty (6) Meat and Fish should be reduced.

Do not neglect the teeth of your children thinking that these milk teeth will one day fall. These are the teeth which help them to chew their food upto age eleven. See that the children clean their teeth twice every day, in the morning as soon as they get up, and before they go to sleep and also wash their mouths properly. Teach them to carefully gargle after each and every meal. Do not allow them to suck their thumb and do not permit them to sleep with mouth open.

Give green guava, sugar cane and other hard things to the children to bite at. This makes their teeth and gum strong and helps the jaw to develop. Keep a watch to see if there is any worm-eaten tooth, and if so at once consult a doctor and act according to his advice. Do this before toothache starts.

The mouth is the gate-way to the body, and such must be guarded well. A mouth in which the teeth, the gums and surrounding tissues show evidences of soundness and health is not only attractive but is a good indication of healthy body and healthy mind. A

healthy mouth is also a safeguard against the dangers of the many ailments that may be transmitted through the mouth.

For good digestion, one must chew properly. For good chewing, one must have strong, healthy teeth and sound gums. Nature did not provide teeth merely for decorative purposes. It's true that a beautiful set of teeth is a sight to hold but they were created for a definite function—chewing. Correct chewing prepares the food so that the digestive tract will have little difficulty in doing its work. Improperly chewed food is a burden on the system. Keep your mouth in a good healthy condition by appreciating the function of the teeth and gums and giving them the care and attention they deserve. To possess healthy teeth and gums, it is vitally essential to follow and maintain a daily ritual of mouth hygiene and periodic examination.

A child with decaying teeth and possibly some abesessed condition, does not chew properly nor digest its food affecting health, growth and development. So it is essential that its teeth and gums be in a healthy state. Decaying teeth giving pain and discomfort must not be allowed in a child; and it should be the duty of the mother to be alert to such conditions and to arrange for periodic dental care. Failure or indifference or neglect to do so is an injustice to the child.

Periodental disease or Pyorrhœa is the disease of the gums and the alveolar bone. Healthy gums and healthy bone, to support the teeth require proper local care and good diet. In vitamin C deficiency the gum becomes swollen and bleeds easily. If the deficiency

is continued for a long time, the alveolar bone may be destroyed so that the teeth loosen and fall out. You must have a clear understanding of the role of diet in preventing dental diseases. The physical character of food plays an important role in keeping the mouth naturally clean, and in providing the teeth and the muscles of the mastication, the exercise which they need.

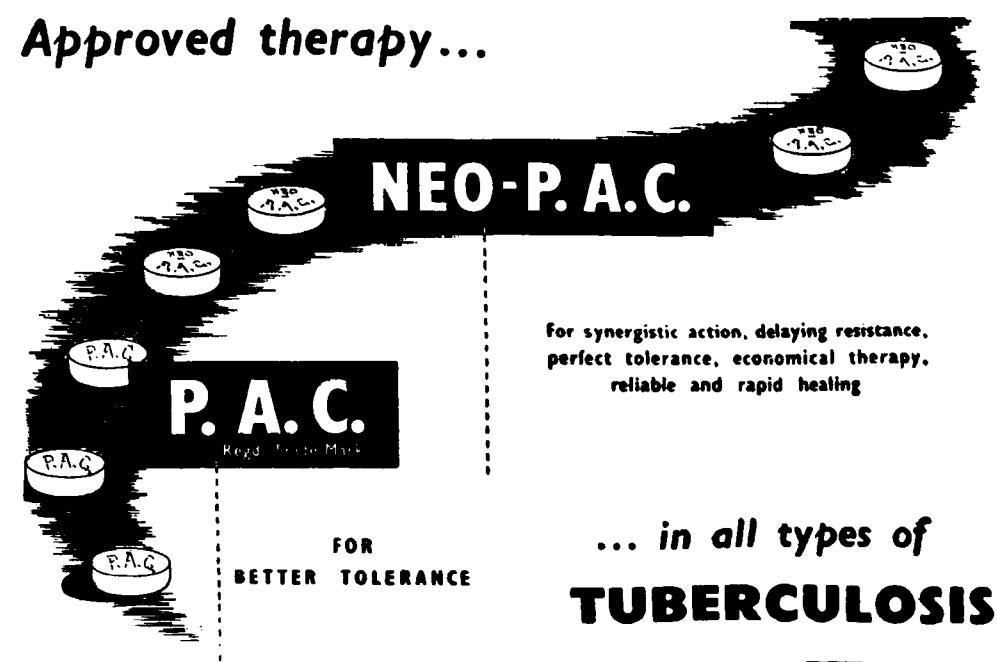
A good diet is necessary for good health for all the tissues of the mouth. Defective calcification of the teeth during their development is due to lack of vitamin, D, C and A, and an insufficient supply of calcium and phosphorus. Therefore, these should be included in a growing child's diet. Mrs. Mellenby's research has indicated that an adequate vitamin C intake is an important factor in the perfection of dental structural development and the prevention of dental decay. Vitamin D, apparently, influences the absorption of calcium and phosphorus: vitamin C seems to regulate their deposition in bony and dental structures during their growth.

A thorough prophylaxis (scaling teeth subgingivally and supragingivally and brushing and polishing the crown of teeth) should be given. Removal of tartar, which is a natural deposit against the teeth, is recommended. There is a heavier deposit in acidic mouth due to the acidity of the saliva. Acidic and ropy, stingy saliva is conducive to dental caries. Frequently rinsing with alkaline mouth washes will help to reduce decay and keep the mouth alkaline. Betelnut and pan-chewing is definitely harmful as the tartar deposits are heavier and eventually lead to pyorrhea. An unclean mouth suffers from the presence of large numbers of Bacteria at the gum margins.

Care of the mouth, which is known as Oral Hygiene is essential to a healthy mouth. Of course, visit your dental surgeon and he will guide you.

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PLANNED PARENTHOOD

By Dr. Mrs Kanakaraj, M.B., B.S.

I WOULD like to discuss this subject from two different view points which though apparently separate and different—are but one leading to the other by a process of mass multiplication. The two view points are the national and the individual.

The reader is aware of the great stress laid by the Government on planned parenthood. It has set apart a vast sum of money annually for the education of the public on the subject and the implementation of the various schemes through intensive efforts. The reasons are obvious. There is an alarming increase in population and what is large will become larger in the future unless a process of control is established. Our five year plans are the ambitions and the political visions of our leaders, the intellectual capacity of our planners and the honest industry of our administrators and workers are meant to lead to but one goal—a new India pulsating with life, with prosperity for all and poverty to none. But all efforts will be in vain unless a method of population control is established. A land of milk and honey cannot be got so long as the number of hungry mouths keep multiplying to sap up the milk and honey even as they are produced. Economic prosperity cannot be developed in such a situation. Hence planned parenthood is important from the national point of view.

Planned parenthood from the individual's point of view is seldom discussed on platforms or through other propaganda agencies and it is my intention to present this to the reader in this article based on my own experiences in my daily work. My efforts in this are particularly directed towards those sections of the public who have adopted a resistant attitude to the subject of planned parenthood and who are not only dogmatically opposed to the scheme but are also so

unkind as to ridicule the staff and personnel concerned in the working of this scheme. They should realise that this too is nation building.

The individual problem is more than superficial. When parenthood is unplanned, it turns the joy and eagerness of the expected event into a trail of fear, anxiety and gloom. The wide eyed mother expecting the unwanted child with misery starting out of her eyes and hopeful anxiety lurking behind, that the doctor may be able to offer some solution to her in her present distress—with her husband standing silently in the shadows and yet overwhelmed by the gravity of the situation—one more to love to nourish, to clothe, to educate and guide and lead through the travails of infancy, childhood, adolescence and finally to manhood or womanhood—and then the loneliness and frustration with which they turn away when told that nothing could be done at this stage and that they should have taken the necessary advice earlier—this is a drama that is enacted almost daily in a thousand places by a thousand characters all over the country. And then again, as those couples turn away in despair, who having lost the benefits of the free family planning advice which the Government has brought to them at every hospital and centre under its control, now err further and resort to methods to solve their problem by falling into the hands of unscrupulous people who deprive them of their money, health and sometimes their lives.

Controlled fertility with suitable spacing on the other hand constitutes so much to the joy of parenthood, the good health of the partners, economic prosperity for the family, greater comforts and opportunities of education, development and advancement for the children. Is it not a goal worth while achieving?

MINIATURE ELECTROSTIMULATOR

Moscow specialists have designed a miniature electrostimulator which weighs only 300 grams and easily fits in a palm. A physician can use it in an ambulance or helicopter or on a mission to a far away village. The miniature electrostimulator makes it possible in the same way as by using similar instruments of conventional size quickly and efficiently to level

out the rhythm of irregular or ceasing heart beats.

The electrostimulator is based on transistors and operates on a pocket flash battery. This is now undergoing clinical tests at Moscow's medical institutions.

Some Common Causes of Blindness and their Prevention

By Dr. K. S. Seshachari, B.Sc., M.B., B.S., D.O.

THE most serious result of ocular disease, short of the relatively rare loss of life, is blindness. The term blindness implies inability to perceive light. But it is obvious that many people, who yet retain some slight degree of sight, are handicapped from the economic point of view.

So the advisory committee on the welfare of the Blind included among the blind all those who are "too blind to perform work for which eye sight is essential".

Statistics as to age incidence show that about 20% became blind in the first year of life. In a home for blind infants, Harman found about 50% due to ophthalmia neonatorum 11% intraocular inflammations and 30% congenital or birth defects.

In our country keratomalacia in young children is very common. There are many cases of Trachoma, Phlectenular keratitis, interstitial keratitis occurring in children of school age. Ophthalmia neonatorum and other infections are much less common nowadays after the advent of penicillin and the allied group of antibiotics.

One of the common causes of blindness is injury coupled with infection. Trivial injuries to the cornea or the black of the eye are aggravated with the infection present in infected tear sacs. Besides this there are various home-remedies most of which are irritant in nature and also infective, being not sterilised. Cases come to the hospital with frequent history of a dust particle being removed with infected fingers or more commonly with infected tongue and various plant juices are applied. It is more the remedy adopted that are disastrous than the actual injury to the eye.

Injuries to eye are important from the industrial point of view. Various types of metallic particles enter the eye resulting in varied degrees of loss of vision. Further the eye loses sight due to sympathetic ophthalmia. So it is very important for all injuries of the eye to be examined by a specialist and the amount of injury assessed and proper treatment instituted.

There are several instances, wherein injuries caused long before and appeared to be trivial to the patient, have resulted in the loss of the fellow eye.

Mention must be made of the improper surgical practice by the quacks, chief among them is couching of the cataract. Here the cataract is pushed into the vitreous by piercing the eye ball with a sharp needle. Temporarily the patient is able to see due to the clearing of the visual pathway. Later on the patients develop terrible reaction, which result in a very painful and at the same time permanently blind eye.

Couching, even though illegal, is practiced in the villages among ignorant and poor people. This brings on the utility of mobile eye camps which could go to the villages and render aid. But cases of couching have been met with in big cities and even among the educated and rich class of patients.

Syphilis, both in the congenital and in the acquired form is responsible for a large amount of blindness. At least 10—15% of cases of blindness in adults are probably due to syphilis. This leads on to the proper investigation of the case and blood examination of pregnant mothers and anti-syphilitic treatment which will lessen the incidence of congenital syphilis.

Atrophy of the optic nerve is the common end result of syphilis. Here, once atrophy has set in there is very little treatment available and so it is important that all syphilitic cases should get their full course of anti-syphilitic treatment in the initial stage itself.

Glaucoma is a serious factor in the production of blindness after middle age. The patients frequently seek the aid of the general practitioners as they have severe headache and vomiting and may be regarded as a simple bilious attack. The chronic form is so insidious in its onset that it is easily overlooked. Here again if treatment is not instituted early, the eye sight is permanently lost due to optic atrophy.

Cataract in its senile form is very common among old people. But with proper surgery and later on



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corrected with suitable glasses, patients get back good visual function.

Cases of iritis and iridocyclitis are commonly met with. Besides the rare causes they are usually due to Syphilis, Tuberculosis, Rheumatism and Leprosy. Proper investigation of the cause of the malady and instituting suitable specific therapy both local and general results in good visual recovery.

Among errors of refraction Myopia is important. It is convenient to classify Myopia as benign and pernicious. The latter is more serious leading on to permanent blindness due to detachment of the Retina or the sensitive layer of the inner coats of the eye ball. Therefore all cases of Myopia should get corrected with suitable glasses in the early stage itself.

Industrial conditions may cause blindness either by disease or accident. The chief factors are poisons such as lead, derivatives of benzene etc. Many of these could be entirely prevented by using suitable guards, screens and goggles.

It is important to do propaganda regarding correct ocular hygiene, the Hazards of irritant remedies, quack surgery and scientific illumination of class rooms in schools and places of work in factories.

Above all there is still greater need for the institutions which take care of the rehabilitation of the blind and find them suitable avocations in life so that their visual handicap is much minimised.

3,000 HEART OPERATIONS IN ONE-YEAR

Operations on the "heart laid bare" have become possible following the invention of devices for the artificial blood circulation—this marks an epoch in the development of radical surgical treatment of cardiac diseases, declared Professor Sergei Kolesnikov.

Speaking at the 5th scientific session of the Chest Surgery Institute, which opened in Moscow, the scientist who is Director of the Institute, said that about 3,000 operations on the heart had been made in the Soviet Union last year. He emphasised that doctors in many cases used "artificial heart-lungs" apparatuses.

One hundred and sixty-four operations on test animals and 36 operations on people suffering from various cardiac diseases, were effected last year in the Chest Surgery Institute in Moscow. Both Soviet and foreign designed blood circulation devices were used.

Professor Kolesnikov recalled that the first device in the world for artificial blood circulation was designed by a Soviet inventor, Professor Sergei Bryukhanenko, in 1924.

The scientists attending the session will discuss the laws governing artificial blood circulation and methods of anaesthetization in operations on the "heart laid bare" and also new surgical methods.

Papers will be read by prominent Soviet surgeons Alexander Vishnevsky, Peter Kuprinov, Boris Petrovsky, Nikolai Amosov and others.

A new film shown at the session today demonstrated all details of an operation to remove tetralogy of fallot, a grouping of congenital cardiac defects. Produced by the Scientific and Experimental Cinematography Department of the Academy of Medical Sciences of the USSR, the film was highly appreciated by the audience.

** ** **

POLYMERS IN GARMENT MANUFACTURE

A new shop, bearing the unusual name of a high-frequency welding shop, has been opened in one of Moscow's garment factories. It will turn out 26 different items of apparel made of polyvinylchloride masticated rubber. The items include protective garments such as surgeons' leggings, visitors' capes, and various aprons, vests and frock for disinfection teams. This shop will also make peignoirs for clients of cosmetic establishments, mattress covers, etc. All these goods will be both more durable and cheaper than those made of cotton fabric.

The first consignment of goods of this department has been sent to several Moscow clinical hospitals and other medical establishments.

The shop will soon undergo expansion in order to launch the manufacture of new kinds of apparel for medical personnel.

**NURSING MOTHERS NEED
EXTRA VITAMIN RATION**

NUTRITIONAL deficiencies in the diet of a nursing mother can cause essential vitamins to be missing from the milk she feeds her baby, two Indian medical specialists report.

Reporting to the Fifth International Congress on Nutrition here, Drs. C. Gopalan and Bhavani Belavady of the Nutrition Research Laboratories in Hyderabad, India, stated, however, that adequate levels of two key factors, Vitamins B-1 and C, show up in the mother's milk after supplements have been added to her diet.

The finding was considered of particular interest because surveys show that more than half the infants in poor Indian communities still are being breast-fed when they are 18 months old. In some areas they receive no other food till after the end of their first year.

Many mothers do not follow a definite schedule for weaning their babies, letting it be determined by the onset of their next pregnancy alone.

The two researchers began their study by analysing the chemical composition of milk samples from more than 300 Indian mothers in poor economic straits. Then they compared these analyses with findings obtained in Australia, New Guinea, southern Africa, West Germany, Great Britain and the United States.

The samples were remarkably alike, they found, in

the general constituents such as fat, protein and solids. "With regard to the vitamins, however, the values obtained among the poor Indian mothers were considerably lower," they said.

The scientists then tested the effect of supplementing the mothers' diet with calcium and Vitamins A, B-1 and C, for test periods ranging from three weeks to nine months. Although higher calcium and Vitamin A intake did not raise levels of these substances in milk, additional Vitamin B-1 and C yielded a significant increase in milk concentrations.

The authors demonstrated in subsequent clinical surveys that populations lacking these essential factors in their diet have a much greater incidence of severe malnutritional diseases.

While studies such as this indicate the need for especially good nutrition during mothers' lactation period, other research has shown that supplementary supplies of vitamins and minerals are required from the onset of pregnancy. Scientists at Cyanamid International's Lederle Laboratories offered one solution to these twin problems by developing a dietary supplement, Filibon, specifically constituted to meet the nutritional strain of both pregnancy and lactation.

Filibon contains 21 essential vitamins and minerals to safeguard the health of expectant and new mothers and, in turn, to help assure the well-being and growth of their infants.

Plastic Lens Returns a Schoolgirl's Sight

The crystalline lens of a schoolgirl's eye was successfully replaced by plexiglass at an institute in Chuvashia. The schoolgirl, Lena Petrova, who had been blind in one eye since she was two, can now see equally well with either eye.

The operation was carried out by a local eye specialist, Svyatoslav Fyodorov. A special die for pressing an exact replica of the lens of Lena's eye was manufactured by the local Cheboksary electrical apparatus plant. Only a week after the bandages were removed her eyesight was 50 per cent of normal. In twelve days it was nearly 75 per cent.

NUTRITIONAL DEFICIENCY DISEASES

By Dr. N. R. Subramanyan, M.B., B.S.

FORTY per cent of diseases seen in the medical wards belong to this group. This has been so far a pretty long time. As one connected with a medical unit for well over a period of two decades this is a common observation I notice.

The word Nutrition denotes supplying of or receiving of nourishment (Food or nutrient). Deficiency in correct nutrition leads to a group of diseases coming under the name of *Nutritional Deficiency Diseases*. Majority of these ailments are due to faulty nutrition.

The fault in nutrition may be due to poor economic conditions, large family, lack of knowledge of nutrition and successive indulgence in certain addict habits as too much of smoking or chewing.

The following are the usual monotonous complaints put forth by patients seeking admission for deficiency diseases:—Breathlessness on exertion, Weakness, palpitation, sore tongue, Diarrhoea, Night blindness, swelling over the legs and abdomen, rumbling noise in the abdomen, benumbed feeling over the extremities, puffiness of face, indigestion etc.

The mouth is the best index of the nutritional status of a person. Sore tongue, ulceration over angles of the mouth, fissures and ulcerations over the lips are evidences to show vitamin deficiency. It is a common observation and a good surmise to make that a “raw red tongue means raw red gut”. Naturally there will be digestive disturbance, rumbling noise in the abdomen and diarrhoea leading to a condition called *nutritional diarrhoea* with consequent weakness, anæmia and emaciation of the individual.

The treatment for majority of these deficiency syndromes are quite simple but time consuming and in the majority of cases preventable. Rest, adequate nutritious good food with plenty of proteins and vitamins, oral iron, Liver injection, Folic acid tablets restore them to their normal state. In a minority of cases resort to transfusion of blood has to be done to tide over a crisis. Normally it takes about a month or a month and a half for correction of nutritional deficiencies and restoration to normal condition. To avoid recurrence, the patient should continue the

advice given and also should maintain good nutrition. Re-admissions for similar complaints are of a common occurrence since majority do not pay heed to the advice given. They either do not continue the medicine for maintenance after discharge or they fail to carry out adequate nutritional standard.

The incidence of deficiency diseases can be minimised if the people are educated on principles of sound nutrition, planned parenthood and increased economic conditions too may offer a satisfactory solution to this common occurrence.

The prevention for the non-occurrence of these deficiency ailments lies in the green grocers and butchers shop rather than in a Chemist or a Druggist shop or in a hospital. A good amount of load and expense in a hospital can be minimised if people do understand the necessity of taking a good mixed diet for normal maintenance of health.

Overeating too is attended with its dangers of obesity, high blood pressure, glycosuria, heart ailments etc. This is a common feature in the economically advanced and well-developed countries.

In choosing the articles for diet, our ideal should be “Food for health and not any food for merely appearing the pangs of hunger”. Foods that we consume are of vegetable or animal origin. They are classified according to their function as (1) Structure Foods (2) Protective Foods (3) Energy Foods.

The structure foods : The proteins derived from the animal and vegetable sources are structure foods. Different types of proteins from different foods are preferable to supply the specially needed essential amino acids. These amino acids are aptly compared to “building stones or bricks” with which different types of structures can be built.

The classification that animal proteins are preferable to vegetable proteins is now out of date. A good combination is now necessary. Eggs, meat, fish and milk form animal sources and nuts (ground nuts, cashew nuts) pulses, Dhal and the gram from the vegetable sources are the richest in their protein

contents and there should be a wide selection from these food articles for perfect and balanced nutrition.

Protective foods : All foods which provide the needed vitamins and minerals for the body are the so called “protective foods”. Milk, eggs and green vegetables occupy an important position in this group. The “keerai” green leafy vegetables, “Drumstick” leaves, corianders leaves are all rich in vitamin A precursors and in addition are also rich in calcium, Iron, Vitamin C and Folic acid. Whole grain cereals, wheat, parboiled rice, millets, pulses, grams, nuts and yeast are all rich sources of vitamin B.

Riboflavin is largely deficient in South Indian diets. Richest sources of food containing riboflavin are eggs and milk, green leafy vegetables, fish and groundnuts also contain and supply sources of riboflavin. Green leafy vegetables are excellent sources of folic acid which has come into use in the treatment of certain types of anæmia and sprue syndromes of nutritional origin. Vitamin C or ascorbic acid is present in plenty in the various types of fruits available. Vitamin D is not present in abundant quantity in the foods but is well-known to be synthesised in the body under the influence of ultraviolet rays of the sun. The growing children, the expectant and nursing mothers need it and should be supplied with one or two teaspoonful of Cod Liver Oil to satisfy the need for this Vitamin.

CANCER DIAGNOSIS AT VERY EARLY STAGE

Several new Soviet apparatuses for diagnosing cancers even at their earliest stages are on view at an annual exhibition of the All-Union Institute of Medical Instruments and equipment which opened in Moscow.

With the new apparatuses it is possible to use minimum doses of radioactive isotopes introduced into the patient's body before the examination. This equipment is so sensitive that it reacts to tagged atoms whose action is commensurable to that of cosmic background radiation.

One exhibit is a diagnostic scintillation installation DSU-60 for thyroid gland examination. By means of an electronic device it registers the amount of radioactive substances accumulated in the thyroid gland and plots it as a curve. For this complex diagnostic technique a minimum amount of tagged atoms is administered to the patient.

The instrument for the early diagnosis of tumours

Ragi, Eggs and milk are excellent sources of calcium. Yellow of Eggs, black gram, nuts and pulses provide sources of Iron.

Energy foods : Animal and vegetable fats are rich sources of energy. The animal fats contain also Vitamin A. The cereals, rice, wheat, the millets, ragi, cambu and cholam are rich in starch and carbohydrates and are pre-eminently foods which give us energy. Sugar and jaggery have got the food value only for supplying energy. The ripe plantain is also a fair source of energy.

In planning diets one should select foods to satisfy the proteins, vitamins and mineral needs of the body and then only choose foods which supply the balance of energy needed from cereals, sugar, starchy foods and fats.

I have attempted and written a few things on nutritional deficiency diseases, and the value of good mixed type of food for health.

The public should be nutrition-conscious select and eat the correct type of diet including all fractions necessary for normal maintenance of health. Age long food fads should be corrected. The lessons of the knowledge of nutrition should be imbibed and practised to make our young men and women virile, strong and healthy.

in the internal cavities of the human body consists of a probe through which pass the rays of light emitted by a scintillator under the effect of radioactive substances contained in the cavity being explored.

The walls of the stomach can be examined by a flexible beta-probe with a miniature beta ray counter at the end. The probe slips easily into the stomach and provides readings from any part of its surface.

Surgeons-oncologists have given high praise to the “GT-60” gammatopograph. The device determining whether there is a malignant tumour or not moves automatically along the entire surface of the human body, while a recorder automatically pin-points the location of tumours and metastases.

Twenty-three new apparatuses are on view. Among them are apparatuses for narcosis and for the ultrasonic treatment of some diseases of the nervous system.

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PREDNIFOR "Vifor"
LENOPON "Vifor"

NEW ANTIBIOTICS

Over the last few years a number of countries, including the Soviet Union, have been engaged in extensive research with a view to developing new antibiotics which are less toxic and at the same time as effective as colimycin, mycerin, etc.

Some success was achieved a short while ago, when a group of scientists working under Professor G. Gauze, Doctor of Biology, at the institute of New Antibiotics of the Academy of Medical Sciences in Moscow, developed monomycin.

Monomycin, obtained from a special radiant fungus found in the soil, has many more valuable properties than its precursors colimycin and mycerin. The main thing is that its toxic effect are slight.

Clinical tests have shown that when swallowed monomycin completely sterilizes the alimentary canal, a very important factor for preparing patients for operation.

As distinct from colimycin and mycerin (and this is highly important), a large part of the monomycin is subsequently excreted with the urine. This will make it possible to use the new preparation in urological clinics for treating difficult infections of the urogenital tract.

Monomycin is very effective in the treatment of all kinds of inflammatory processes caused by staphylococci, microorganisms which are highly resistant to other antibiotic, for instance, penicillin, streptomycin, levomycetin, etc.

Equally favourable results have been obtained in the treatment of enterocolitis, a children's intestinal disease. The effects have been good in cases where all other antibiotics have failed.

Monomycin has been approved for wide use in practice. It will be put into production next year.

How Malaria was Eradicated in the Soviet Union

By Y. Baranov

Member of the Editorial Board of
Zdorovye (Health)

TILL recently malaria carried off thousands of lives of adults and children in the USSR.

In the very first years of its existence the Soviet Government launched a country-wide campaign against malaria. The decisive measures taken, which proved very effective, were the active treatment of malaria patients and the prevention of relapses, on the one hand, and the elimination of the anopheles which carry malaria, on the other.

Of decisive importance in fighting the disease were, the use of effective medicinal preparations such as plasmocidum, quinacrine and quinocidum, and the application of DDT and hexachloran to destroy the anopheles. The construction of special factories to produce anti-malaria preparations made it possible to ensure adequate treatment of all malaria patients.

The workers of the sanitary-epidemiological stations were in the forefront of the struggle against malaria. Their efforts were above all aimed at detecting, within the shortest possible time, all persons suffering from malaria and immediately proceeding to their treatment. This was essentially a matter of time. It was vital not only to enable the patient to recover his health and ability to work but also to prevent any further spread of the disease.

The fact is that 24 hours after a patient has taken plasmocidum with quinacrine he ceases to be infectious. Another efficacious remedy is the Soviet preparation quinocidum; after taking it the patient scarcely ever has relapses of the most common form of three-day malaria.

Once malarial fits cease, the patient feels quite well, and sometimes, contrary to medical advice, he discontinues the treatment. This is a serious mistake which has grave consequences. The patient may have repeated relapses and, even worse, become a source of infection for others.

It stands to reason that medical workers must detect all malaria cases, prescribe treatment and see to it that the patients comply with instructions. In the Soviet Union there are more physicians, doctor's assistants and nurses per one thousand of the population than in any other country. The success of the campaign was also ensured owing to the fact that the medical workers were able to enlist for the campaign their reliable helpmates, active members of the Red Cross and Red Crescent societies or school-children willing to cooperate.

DESTROYING ANOPHELES

To put an end to malaria it was essential to solve another, equally important task: to destroy anopheles and carry out sanitary measures in marshy localities. Marshes or shallow neglected reservoirs with overgrown weeds and stagnant water were especially dangerous because these localities are usually the breeding grounds of anopheles.

This mosquito is man's worst enemy. In their lectures or talks accompanied with films or diagrams the medical workers described the anopheles and the means to destroy it.

As a result of such lectures adults as well as children were able to distinguish the common mosquito from the anopheles. They came to know that each female anopheles lays up to 250 eggs and each hectare of marshy locality can breed from 2 to 3 million mosquitoes in one summer. The anopheles can fly three or more kilometres from its breeding grounds and therefore it is better to build new settlements far away from large marshes. Measures must be taken to systematically destroy the source of infection in the breeding grounds.

What were the sanitary measures taken to eradicate anopheles? In some localities a small minnow, gambusia, a valuable exterminator of mosquito larvae, was

introduced into the reservoirs; in others, the reservoirs were treated with oil, green of Paris or hexachloran. Houses and other premises were treated with DDT. Vast marshy areas were drained with the active participation of the population.

Splendid orchards and coppices of valuable trees were planted on the sites of the drained marshes. In

a short time the once dangerous localities causing malaria were transformed magically into healthy lands.

The efforts of research and practical medical workers and the vigorous participation of the entire people brought about remarkable results. Malaria in the Soviet Union was wiped out for ever.

WORLD'S BIGGEST CANCER INSTITUTE BEING BUILT IN USSR

A new Institute of Experimental and Clinical Oncology of the Academy of Medical Sciences of the USSR is now being built in a suburb of Moscow. It will be the biggest oncological centre not only in the Soviet Union but throughout the world. Over 30 various buildings—a whole city of health—will go up on the grounds of 16 hectares. All scientific and clinical work will be concentrated in the seven main blocks with the biggest of them housing the laboratories. This six-storey building housing all laboratories required for cancer research will have up-to-date equipment. A conference hall seating 700, with

radio and television services laid on, is being equipped there. Television transmissions will be in colour. The clinical department of the institute will have two blocks, the first designed for 360 beds. The second clinical block with 30 beds, the radiological, will provide for radioactive substances and radiation in treatment. An up-to-date signalling system is to be used in the wards. The medical nurse sitting at her desk in the passage will be able not only to talk with the patients but also to listen to their respiration. The visitors will be able to talk with the patients over a telephone provided with a television screen.

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CARDIAC SURGERY IN THE USSR

By Professor B. Khromov

THE unusual intricacy of the anatomical structure of the heart and lungs, their tremendous, vitally significant role, the exceptional sensitivity which, during operations on these organs makes the condition of the patient especially grave, the danger of air entering the pleural cavity and the particular danger of infection—all these prevented the successful development of thoracic surgery. It took many years of persistent work to overcome these difficulties.

The first attempts to suture the heart were made in the eighties of the last century. These experiments were first conducted on animals. Later, operations were performed on men suffering from injury to the heart. Since then the human heart has ceased to be considered "out-of-bounds" for the surgeon's scalpel.

It should be emphasized that the suturing of a wounded heart results in recovery in over 70 per cent of the cases. Blood transfusions also play a significant part in saving the patient's life.

Soon after the first successes in suturing the heart, surgeons attempted to remove foreign bodies from this organ.

These operations are now a matter of history, but the experience gained laid the foundation for the further development of thoracic surgery.

Nowadays surgeons in all countries are intensively studying new intricate problems concerning the surgical treatment of various diseases of the heart, including its congenital and acquired defects.

MODERN METHODS OF DIAGNOSIS

Of great significance in cardiac surgery was the development of modern methods of diagnosis of various diseases, such as X-ray examination of the heart and the blood vascular system with the introduction of contrast substances and the study of cardiac activity by delicate instruments like the electro-cardiograph. The cardioscope, a new interest-

ing optical instrument which makes it possible to see and even photograph heart cavities and to conduct various operations within them under visual control, has come in existence recently. Experiments on artificial circulation and the creation of various apparatuses for this purpose, such as "artificial heart and lungs" may also be mentioned. Such experiments began in the Soviet Union as far back as 1928. A number of models of "artificial heart and lungs" have already been tested in the Soviet Union. One of the models, designed by a group of engineers and surgeons of the Research Institute of Surgical Apparatuses and Instruments, has proved the best.

Hundreds of operations for removing congenital heart defects have already been performed, and, as a rule, they have resulted in the complete recovery of the patients.

The surgical treatment of various acquired heart defects, which are mainly due to rheumatic endocarditis, is a much more difficult and complicated task.

It may be noted that acquired heart defects occur more frequently than congenital, and constitute 97 per cent of all heart defects.

Years of experimental study by eminent Soviet surgeons like I. P. Dmitriev, N. N. Terebinsky, A. I. Yarotsky and others, have preceded modern operations on the heart. Special instruments provided with an electric lamp and optical system, making it possible to see the heart valves and to perform operations under visual control, are available at present for intracardiac surgery. Hundreds and even thousands of such operations have been successfully carried out up to the present time. The results of surgical treatment of mitral stenosis are quite satisfactory: about 50 per cent of the patients undergoing this operation are able to resume work.

OPERATING ON "DRY" HEART

Attempts to operate on a "dry" heart with its temporary "exclusion" from the circulation by

occlusion of the venae cava are very promising. When combined with certain new methods of anaesthesia such occlusion of the veins makes it possible to "exclude" the heart from circulation for 15-20 minutes and even longer. However, the use of the apparatuses mentioned above for inducing artificial circulation and thereby ensuring the complete exclusion of the cardiac function during an operation has opened even greater possibilities for cardiac surgery. Such a brilliant operation was performed for the first time in the USSR by the famous Soviet surgeon Prof. Vishnevsky at the end of 1957. He successfully operated on an 11 year-old boy who suffered from a grave congenital heart disease.

Professor P. A. Kuprianov, an outstanding Soviet surgeon, performed some time back another most intricate intracardiac operation—and a successful one—for the repair of congenital interauricular septal defect. Such operations are a new step in the further development of intracardiac operations.

In 'decompensated' heart defects when surgery of the heart is contraindicated, a number of other operations are employed. These operations, such as ligation of certain large veins in the abdominal cavity, considerably improve the circulation of blood. The positive effect of these operations sometimes lasts several years.

ANGINA PECTORIS

There have been very interesting attempts at surgical treatment of angina pectoris or of coronary

insufficiency due to a spasm or sclerosis of the blood vessels supplying the heart. Conservative treatment by medicines is indicated in a majority of cases of angina pectoris. However, surgical treatment is required in grave cases with frequent severe attacks of pain.

Various methods of administration of novocaine solution into the mediastinal cellular tissues are employed (novocaine block). This is done to relieve the suffering of the patients by affecting the nerve plexuses of the heart. In a number of cases substernal cellular tissue, various muscles of the lungs or omentum, i. e. the tissues rich in blood vessels, are sutured to the heart muscle to improve its circulation. Finally, the heart veins are ligated and certain operations on the pericardium are done for the same purpose.

Attempts at surgical treatment of the severe malady known as myocardial infarction (that is, a sudden obstruction of the vessels of the heart with acute disturbance of the cardiac function) are of great interest. The first experiments on animals lead one to assume that in time surgical methods of treatment of myocardial infarction will occupy a due place in medical practice. Thoracic surgery in the USSR has already attained considerable success and is advancing rapidly. The achievements of outstanding specialists in this field are becoming widely known to practising doctors. It is especially satisfying to note that complicated operations on the heart, lungs and the oesophagus are now performed not only in clinics and hospitals of the capital, but more and more frequently in many other cities of the Soviet Union.

Scientists confirm Favorable Results with Anti-Cancer Drug

Researchers from the National Cancer Institute reported that a five year study has confirmed their previously published findings that the drug methotrexate does control some cases of choriocarcinoma, a rare but highly malignant form of uterine cancer.

Dr. Roy Hertz and associates told scientists gathered for the 52nd annual meeting of the American Association for Cancer Research that 30 of 63 patients treated with methotrexate are now free of evidence of the disease. Several of these women have had no indication of return of the disease for up to five years since their treatment was completed, according to the government scientists. The disease is extremely

rare, however, affecting approximately 300 American women each year.

Of particular significance, they said, is that in all these cases the tumor had spread outside the uterus into other parts of the body, most frequently into the lungs. They termed this response "uniquely favorable" and indicated that complete return to good health for periods of five years following chemotherapy for a malignant tumor has not been previously observed.

Methotrexate belongs to a class of drugs called folic acid antagonists which so closely resemble the

vitamin folic acid that, in effect, they "trick" the cancer cells into absorbing. But once absorbed, the antagonists provide no nourishment for the cancer cells and seriously interfere with their growth.

The drug was discovered and developed at Cyanamid International's Lederle Laboratories under the direction of the India-born scientist Dr. Yella-pragada Subba Row as part of Lederle's 22 year cancer research activities. It was initially used in the treatment of leukemia and often helps prolong the lives of its child victims by several years.

Dr. Hertz' research with the drug began in 1956. By utilizing large doses of the drug and by administering it early in the disease, he was able to report "considerable success" in treating 17 patients in 1958. However, this disclosure represents the first report of a five-year follow-up study on the disease.

In addition to methotrexate, the researchers reported treating 14 of the women for short periods of time with a recently developed plant derivative called Vincalukoblastine. These medications have severe side effects, but the doctors described their methods

for insuring the complete recovery of their patients from such undesirable and somewhat hazardous effects. Assisting Dr. Hertz with the study were Drs. John Lewis, Jr. and Mortimer B. Lipsett.

PAINLESS OPERATION

Prof. Petrovsky, Lenin Prize winner, head of the surgical clinic of Moscow Medical Institute No. 1, and Efuni, M. Sc. (Medicine), worked for a long time on the problem of removing pains after an operation, which until recently were regarded as inevitable. As a result of their efforts, a patient does not feel pain any longer either during an operation or after it. On Prof. Petrovsky's initiative a new ward, known as a reanimation ward, was set up for patients recovering after serious operations. Usually a patient begins to feel pain when the effects of the narcosis wear off. To avoid this, nitrous oxide is now being used. It is perfectly harmless and also restores normal breathing and improves the work of the heart and vessels. Nitrous oxide is not a new narcotic, but it is now being applied to fight against pain in the post-operational period.

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RAILWAYMEN SERVE THE NATION

By D. C. Baijal

Member, Staff, Railway Board.

Shri D. C. Baijal in his article outlines the various measures taken by the Indian Railways for the welfare of a large "family" of railwaymen and their children. These include provision of houses for the staff, medical facilities, opening of railway schools and holiday homes and other recreational centres. During the Second Plan the expenditure on staff welfare would be of the order of Rs. 50 crores.

The author says that the railwaymen on their part are quite alive to their responsibilities to the nation and are ready for greater and more difficult tasks ahead of them in the Third Plan.

WE will once again be celebrating "Railway Week" from 10th to 16th April. The observance of "Railway Week" has dual object, firstly development of a feeling of kinship, camaraderie and pride in their work amongst railwaymen of all ranks and secondly stimulation of friendly interest and co-operation of the general public in the day to day working of the Railways.

April 16 has a special significance for railwaymen in this country, for it was on this day in the year 1853 that the first passenger train ran from Bori-Bundar (Bombay) to Thana, a distance of 20 miles. This was widely acclaimed at the time as the first event of its kind not only in India but in Asia.

VAST NETWORK

From this small beginning, the Railways in the country have grown into a vast network, comprising over 35,200 route miles and over 51,700 track miles. Extending from Dwarka in the West (Longitude 69° 0' E) to Lakhapani (Longitude 95° 50' E) in the east, and from Madhopur (Latitude 32° 20' N) in the north to Trivandrum (Latitude 8° 40' N) in the south, Indian Railway system is the largest in Asia and the fourth largest in the world. It is the country's largest nationalised undertaking, and the world's second largest state-owned railway system.

To run this great undertaking and keep the wheels of transport moving night and day on this vast network of railways, over a million devoted men and women serve the nation. The total number of staff on

Government Railways, permanent and temporary, open line and construction on March 31, 1960 was 1,154,013.

The cost of staff, including allowances, provident fund contribution, gratuity, value of grainshop concessions, etc. amounted to Rs. 189.26 crores.

Out of 1,154,013 employees in 1959—60, the number of gazetted officers was 4,408 only, which represents 0.38 per cent of the total. Amongst the non-gazetted staff, 144,319 or 12.51 per cent were in Class III in the category of workshop and artisan staff, 314,314 or 27.24 per cent in Class III other categories, 181,319 or 15.71 per cent in the category of Class IV workshop and artisan staff and 509,653 or 44.16 per cent others.

JOBS THAT RAILWAYMEN DO

The general public and the patrons of the Railways come in contact with only a small percentage of the staff, such as booking clerks, ticket collectors, travelling ticket examiners, guards, conductors, guards, drivers, goods clerks, station masters and the like.

There are, however, a large number of staff who work behind the scenes to enable this big organisation to function efficiently and smoothly. There are the gangmen, keymen and mates, who work hard in sun and rain to maintain the tracks in a safe condition. There are the fitters and khallasis in the Loco Sheds to keep the engines in good fettle and the train examiners, fitters and khallasis in sick lines to maintain and repair the goods wagons and coaching vehicles.

There are the artisans and other staff in workshops to attend to periodical overhaul and heavy repairs of rolling stock. There are the signal staff to keep the complicated signalling gear in good order to make travel safe. There are the cabinmen for manning points and signals to ensure safe reception and despatch of trains, and the gatemen often living in wilderness, who man the level crossing gates.

Then there are the clerks in offices, who have their own role to play and the doctors, who keep the railwaymen and their families in good health. There are a host of others, in fact too numerous to mention, but each category having been entrusted with a well defined task.

There are an indefinite number of jobs that have to be done on the railways, and it is the co-ordinated effort of the staff of various categories, irrespective of the position they are placed in, that enable the railways to function satisfactorily.

Ours is indeed a very large family of railwaymen. Scattered all over this vast sub-continent, along railway lines running criss-cross over the entire country through hills and dales, and across mighty rivers, the railwaymen are tied together by common bonds of service to the nation. They have the proud privilege of serving the nation and playing a significant role in the planned development of the country in its march forward to improve the living standards of the masses.

STAFF WELFARE

The Railways, the largest employers of labour in this country, have been pursuing the policy of progressively improving both the living and working conditions of staff and providing them basic amenities to the maximum extent possible. Not only have the wages been increasing progressively; the expenditure on welfare measures has also been steadily mounting up.

In 1950—51, the expenditure on welfare was Rs. 3.10 crores. During the First Five Year Plan, the expenditure was Rs. 20.01 crores, an average of Rs. 4 crores per annum. During the Second Five Year Plan, the expenditure would be of the order of Rs. 50 crores, giving an average of Rs. 10 crores per annum.

MEDICAL FACILITIES

There has been a progressive expansion of medical facilities. The number of railway hospitals on March

31, 1950, was 56 and of dispensaries and health units 341. The number had increased to 74 hospitals and 478 dispensaries and health units by the end of 1959—60. The total number of beds during the same period had increased from 2351 to 6848. The number of T.B. beds taken separately has gone up from 77 to 1033.

Honorary consultants and specialists have been attached to well equipped principal railway hospitals, where the most complicated cases can now be tackled. Mobile dispensaries on wheels have been introduced for catering to the staff at wayside stations. The expenditure on medical and health services has risen from Rs. 2.70 crores in 1950—51 to Rs. 6.13 crores in 1959—60.

STAFF QUARTERS

Residential accommodation was in the past provided to a limited extent, but in recent years there has been a very substantial increase. During the First Five Year Plan, 41,000 quarters of an improved standard were provided for the staff.

In the Second Five Year Plan about 57,000 quarters would have been added. Improvements are also being progressively made to old type of quarters with provision of better ventilation, water borne sanitation and electrification.

Besides the canteens statutorily required to be provided under the Factories Act, 1948, the railways have provided, as a measure of staff welfare, canteens at places where there is concentration of staff. This number has been steadily increasing. There were only 69 canteens before the commencement of the First Five Year Plan. Their number had risen to 225 in 1959—60.

RAILWAY SCHOOLS

Although education is primarily a State subject, Railways have been providing facilities for education of the children of their employees in large railway colonies, where such provision does not exist, and no alternative means are available.

On March 31, 1950, there were 135 such schools. This number had increased to 163 in 1959—60. In addition, 481 single teacher primary schools have recently been started. It would be interesting to note that besides these, there are 194 schools opened by and run by railwaymen themselves in large colonies in various parts of the country.

A recent innovation is the opening of 12 subsidised hostels in different linguistic areas to meet the needs of wards and children of railwaymen posted outside their own linguistic area.

In 1950—51 the annual expenditure on education was of the order of Rs. 32 lakhs, but by 1959—60, it had risen to Rs. 245 lakhs.

In 1956, a scheme of awarding 1,000 scholarships each year to all children of railway employees for the persecution of education in science and technical subjects was started. The total number of scholarships including those carried over from previous years is about 2,500 at present, involving an expenditure of Rs. 8 lakhs per annum.

STAFF BENEFIT FUND

There are a number of items of minor welfare for which no special allotment is made directly from railway revenues. These are financed from Staff Benefit Fund, which in itself is financed by *ad hoc* grants from revenues.

For a number of years the grant was Re. 1 per head. In 1955 it was raised to Rs. 2 per head and in 1959—60, it was raised to Rs. 4 per head. Recently it has been further raised to Rs. 4.50 per head.

From this Fund is met expenditure on items like grants to employees on account of loss suffered by them in floods, etc., relief of distress in any other form, grants to schools run by railway employees and private schools, scholarships to children of railway employees, recreation and amusement of staff and their children.

RECREATION FOR RAIL EMPLOYEES

For recreational and cultural activities, a large number of institutes and clubs have been provided, their number at the end of 1959—60 being 373 and 227 respectively. Some of these Institutes have libraries with a large collection of useful books.

For the benefit of the staff posted at wayside stations, the system of mobile libraries on wheels has

been started. There were 9 such libraries at the end of 1959—60.

Handicraft Centres have also recently been set up in Railway colonies, where women members of railway men's families are taught handicrafts, such as weaving, spinning, knitting, cutting, tailoring, etc. during their spare time. There are 154 such centres functioning.

HOLIDAY HOMES

Provision of Holiday Homes for the staff at hill stations, health resorts and other places of interest, where railwaymen with their families could spend their holidays in comfort, was started in 1956. By the end of 1959—60, fifteen Holiday Homes had been and these are proving to be very popular.

For the children of railwaymen, children's camps are also being organised. During 1959—60, 22 such camps were held.

RAILWAY CO-OPERATIVES

The Co-operative movement on the Railways has also continued to make steady progress. At the end of 1959—60, there were 25 Railwaymen's Co-operative Credit Societies with a membership of 6.18 lakhs and paid up share capital of Rs. 4.31 crores. The working capital was Rs. 26.38 crores.

The number of Co-operative Consumer Societies in 1959—60 was 159, with a membership of 74,494, paid up share capital of Rs. 13.65 lakhs, working capital of Rs. 24.68 lakhs and a turn-over of Rs. 160 lakhs.

AWARDS FOR EFFICIENCY

For enlisting the co-operation of the staff and to inspire in them a sense of common endeavour, a large number of Joint Committees have been set up at various levels through which the railwaymen can make suggestions for improving efficiency, effecting economies, ensuring safety of travelling public, etc. suitable awards are given for valuable suggestions and inventions. Individual or collective awards are also given for displaying exceptional merit in the performance of duties.

During the Railway Week, outstanding railwaymen from Zonal Railways come upto Delhi to receive awards from the Railway Minister.

PHENOMENAL INCREASE IN RAIL TRAFFIC

With the ever increasing tempo of industrial activity and planned development in the country after attainment of Independence, there has been a phenomenal growth of traffic the railwaymen are required to handle.

In 1950—51, the originating tonnage of freight traffic was 91.4 million tons only. In 1955—56, the end of the First Five Year Plan, this had risen to 114 million tons, an increase of 24.7 per cent. In 1960—61, the end of the Second Five Year Plan, the originating tonnage expected to be lifted is 154 million tons, an increase of 35.2 per cent during the period.

During the two Five Year Plans the ton miles would have more than doubled, from 26,963 miles in 1950—51, to an expected figure of 54,720 miles in 1960—61. During the same period passenger traffic would have increased from 41.159 million in 1950—51 to an expected 44600 million in 1960—61.

In order to be able to handle the increasing volume of traffic it has been found necessary to go in for substantial increase in the capital at charge for the rehabilitation of and the addition and improvement to the railway assets for augmenting the transport capacity. In 1950—51, the capital at charge stood at Rs. 827 million. It is expected to go upto Rs. 1559 million at the end of 1960—61.

DEVELOPMENT WORKS

The development works include construction of new railway lines, doubling of tracks, remodelling of marshalling yards, provision of additional crossing stations, improvements in signalling and telecommunications, expansion of workshops capacity, dieselisation, electrification and substantial addition to rolling stock.

During the Second Five Year Plan the fleet would have increased by some 2100 locomotives, about 8500 coaches and about one lakh wagons. All this would mean additional burden on our railwaymen.

COST ON STAFF

The number of staff on Railways in 1950—51 was 913,553 and the cost of staff amounted to Rs. 113.82 crores. As against an increase in the strength of staff

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of 26.3 per cent, there has been an increase of 66.4 per cent in the cost of staff in the same period.

The average wage per employee has been increasing steadily and has risen from Rs. 1,263 in 1950—51 to Rs. 1,660 in 1959—60. It is expected to rise further to Rs. 1,880 in 1960—61.

The main reasons for the increase are the implementation of recommendations of First Pay Commission, Adjudicators Award, upgradation and re-distribution of posts, increases in the rates of dearness allowance, compensatory allowances, etc., treatment of dearness allowance as pay for certain purposes and the net effect of annual increments.

The acceptance of the Second Pay Commission's major recommendations regarding pay and allowances will increase the per capita annual wage by bill Rs. 84 on the average. The retirement benefits will also substantially increase.

INCREASED WORK LOAD

The increase in the number of staff has been comparatively smaller. It has been necessitated due to higher work load in maintaining larger assets, the carriage of increased traffic, progressive expansion of health and welfare measures for the staff, increasing public utility service functions assumed by railways, such as departmental catering. This is also due to projects of various development works on Railways during the period including the two Production Units, Chittaranjan Locomotive Works and the Integral Coach Factory, Perambur.

While the increase in staff between 1950—51 and 1959—60 for all the reasons taken together has been 26.3 per cent, the total train miles, an index of traffic handled, has increased during this period by 32 per cent.

THIRD PLAN TASKS

We are now completing the Second Five Year Plan and are on the threshold of the Third Plan, which will

require a tremendous effort on the part of every one of us to fulfil the task assigned to the Railways.

According to the tentative targets, the originating traffic at the end of the Third Plan is expected to increase from 154 to 235 million tons and a provision has to be made for a 15 per cent increase in passenger traffic.

The work-load for the Railways in ton miles is, however, expected to increase from 54,000 million ton miles to 93,000 million ton miles more annually, which is more than double the increase achieved in the Second Plan.

The task is tremendous, but railwaymen are alive to their responsibilities to the nation and will launch upon the Third Plan with faith and determination.

While replying recently to the debate on the Railway Budget for 1961—62 in the Rajya Sabha, the Minister for Railways paid tributes to railwaymen as follows :—

“Quite a large number of Hon'ble Members have taken part in the general discussion of the Railway Budget and there has been all round appreciation of the achievements and performance of the Railways. That goes generally to the credit of the patriotism and sense of duty of more than a million of the railwaymen on the Indian Railways and I have no doubt that the words of encouragement that have been spoken in this House will put heart into the Indian Railwaymen and they will prepare themselves for the greater and more difficult task ahead of them in the Third Five Year Plan.”

He expressed similar sentiments in the Lok Sabha.

We railwaymen greatly value these words of encouragement. Let everyone of us take a pledge during the Railway Week to strive our very best to prove ourselves worthy of the trust reposed in us and fulfil the targets assigned to us.

ONE-THIRD OF CANCER PATIENTS NOW BEING SAVED

The lives of one-third of the cancer patients in the United States are now being saved, the American Cancer Society reports. The next goal is to cure one-half of all those who get cancer, the society says. Death rates for most forms of cancer have been stabilised, according to the society. But the death rates for lung cancer continue to show an increase. The society considers a cancer patient's life “saved” if he is alive and free of evidence of cancer five years after diagnosis and treatment.

Hospitals on the South Eastern Railway

*Some interesting problems encountered
in designing hospitals*

By Dr. A. Ramdas, M.B.B.S., M.S., D.P.H.
Chief Medical Officer, South Eastern Railway

THE South Eastern Railway has seven hospitals at headquarters of medical districts in charge of District Medical Officers and two hospitals at important stations, other than the district headquarters, in the Khargpur medical district, in charge of Assistant Medical Officers. There are 460 beds in all in the above hospitals.

The brunt of the expansion programme of Indian Railways in the First and Second Five-year Plans was borne by the South Eastern Railway, which was called upon to serve the needs of two gigantic Steel Plants in the Public Sector. The ex-B.N. Railway, from

which the present South Eastern Railway was mainly carved out, was mostly serving a famine-stricken underdeveloped tract. The Railway originally was a privately managed one. Its workload was comparatively little. The outlook of its Administration on unremunerative works like hospitals and quarters for staff was determined by the need for observing stringent economy. The Railway's phenomenal expansion after Independence was not perhaps originally foreseen.

The B.N. Railway had only two good hospitals, one at Khargpur for serving its large workshop and color and the other at Adra for catering to the medical needs

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of a busy colliery region. These hospitals were fairly well-planned, had adequate number of beds and considerable amount of good equipment, because they served a large number of officers stationed at the headquarters as well as a number of European and Anglo-Indian senior subordinates.

The other districts which had headquarters hospitals were few. Even these few hospitals were maintained more for satisfying statutory obligations, rather than for being of real use to the Railway population.

The B.N. Railway was taken over by the Government of India on 1-10-1946. With the change in management, also came a gradual change in outlook of the Administration. Economy was not the only consideration for deciding provision of welfare measures for staff. But considerations of economy in incurring expenditure on individual welfare works like hospitals still played a large part in deciding issues.

Besides, the planners of hospitals were still cramped by the hang-over of an outlook of the past. During this period new hospitals came into existence at Garden

Reach, Waltair and Nainpur. These were mostly improvised out of existing buildings like the General Manager's residence, a Railway institute and an old dispensary. The transformation was effected through the enthusiasm of the medical Department, coupled with imaginative improvisation by the Engineers. The philosophy in putting up these hospitals appears to have been "Let us get to-day what little we want: why bother about tomorrow?"

The advent of the First Five Year Plan found the Medical Department of the South Eastern Railway sponsoring a fairly ambitious Works Programme for making up leeway for lapses of the pre-Independence era. But for some reason or other, the wings of this programme were clipped. The actual achievements of the truncated targets were even less.

The impact of the Second Plan expansion literally caught the Medical Department on the wrong foot. There was large scale expansion of stations, yards, workshops and colonies. The attention of the Engineering and other departments was focussed on line capacity and other new works for meeting the

rapidly expanding workload of the Railway. The needs of the Medical Department naturally appear to have been relegated to the background till three years of the Second Plan had passed on account of the importance of Operating and other needs.

The last two years of the Second Plan witnessed a spurt in all round expansion of hospital services on the Railway on account of a felt need of the Railway population. Sanctioned plans as originally drawn up for expansion of existing hospitals were altered adopting new designs. New hospitals were put up where there were none before. In spite of these efforts the Railway was able to achieve a target of only 3.65 beds per thousand employees at the end of the Second Plan, as against the target of 5 per thousand employees prescribed by the Railway Board.

The tempo of development of the last two years of the Second Plan is expected to be maintained during the Third Plan period. The planners have benefitted by the valuable experience gained from the successes and failures of the past. The fact that Staff Welfare works during 1961-62, the first year of the Third Plan, have been allotted the major share of expenditure under Demand No. 10 is a good augury for the future. Among Staff Welfare works, the needs of the Medical Department have received the lion's share of attention.

With the background furnished above, the reader will appreciate the various problems of hospital designing that were encountered on the South Eastern Railway during the period of transition. Some of these problems are enumerated below and the methods adopted to solve them are also indicated:

(1) PROBLEMS CONNECTED WITH FAULTY SITING OF EXISTING HOSPITALS

Many of the existing hospitals were sited in a locality at a time when the colony was small and the extent and direction of future expansion was not anticipated. In the vastly expanded colonies of to-day, the hospital is not located centrally with regard to accessibility to the Railway population. The hospital at Adra is an example. Greater part of expansion of the colony has occurred on one side and in a direction away from the hospital. Such a short-coming as this is expected to be avoided in the siting of the new hospital of Bilaspur which is nearing completion.

(2) PROBLEM OF LACK OF SPACE AROUND THE EXISTING HOSPITALS FOR FUTURE EXPANSION

Originally a small hospital was put up at a site with limited dimensions which was hemmed in on all sides by residential and other buildings. When expansion of the hospital became inevitable at a future date, there was no elbow room at all for putting up additions. The Garden Reach, Chakradharpur and Bilaspur old hospitals posed this problem. It was solved at Bilaspur by putting up a new hospital at a new site. The old hospital was a sub-standard building of patch-work type which, that was agreed, to be uneconomical to maintain or expand. Conversion of the building subsequently for other use was considered justified. At Garden Reach, the extension had to be squeezed with great difficulty into the only meagre open space in front of the old hospital. Maximum use of the space available was ensured by building up vertically and having a 3-storey new building. At Chakradharpur, the little space that was available round the old hospital was utilised for putting up an extension, because it was considered uneconomical to give up the existing hospital building. Further space for expansion is not available at this site. It is proposed to provide for expansion by putting up an additional floor over the existing ground floor. It will not be possible to expand this hospital further because the local black cotton soil is understood not to permit putting up of multi-storied buildings. For new hospitals, under construction or to be constructed in the future at Bilaspur and Waltair, ample space for expansion both sideways and vertically has been provided.

(3) PROBLEM OF UTILISING EXISTING HOSPITALS FOR CURRENT NEEDS

The concepts of internal designs of hospitals are bound to change with the change in concepts of functions of hospitals. This problem is being faced by hospital planners the world over. It is likely to prove a difficult one in the future, because after the second World War, the types and extent of services expected from modern hospitals are undergoing radical and frequent changes as a result of the advancing frontiers of Medicine.

On the South Eastern Railway, this problem was encountered with the Garden Reach and Khargpur Hospitals. In the Garden Reach Hospital, the existing building is an old palace with a ceiling about 18 ft. or more high. It is difficult to keep such a high ceiling

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free from coal dust and cob-webs. Periodic distempering of the high walls and ceilings poses problems of evacuating entire wards to permit use of tall ladders and other engineering equipment. The service rooms attached to the wards have neither the floor space nor the proper spatial relation to the wards which they serve. Tall, supporting Grecian columns and awkward corners projecting into the wards and service rooms, render maintenance of cleanliness a real problem. As the want of alternative open space for putting up a new hospital was acute in this locality, the existing hospital had to be put to some use for the Medical Department even after constructing a new extension consisting of indoor wards. The problem is being solved by locating all the indoor beds in the new block and using the old hospital for the laboratory, Dental, E.N.T. and Eye Clinics, Central Medical Library, staff reading room, Medical Stores and medical examination room. A similar problem is being encountered at Khargpur and is expected to be solved along the same lines.

**(4) PROBLEM OF ELIMINATING
UNPRODUCTIVE WORK BY STAFF
DUE TO FAULTY INTERIOR DESIGN
OF OLD HOSPITALS**

The old hospitals were originally designed for meeting a limited need. As expansion became necessary latter on, patch-work additions were made from time to time without any regard for the convenience of movement of staff on duty. As a result, staff waste considerable energy and time on useless movements. The Khargpur Hospital is a good example of this. A solution for the problem is under study.

**(5) PROBLEM CREATED BY UNÆSTHETIC
APPEARANCE OF SUBSEQUENT ADDITIONS
TO THE OLD HOSPITALS**

The outward appearance of a hospital is important from the point of view of the impression created in the mind of a potential patient. Here again, patch-work additions to the original hospitals at different periods and in accordance with the changing architectural concepts of each designer, have created many buildings of poor appearance. The responsibility for this state of affairs is as much of the original designer as that of his successors. Besides, a solution for a problem of this type is difficult to find, because there is a justifiable reluctance to incur expenditure on remodelling exteriors of hospitals, since there is no obvious benefit for the patients, except that of whetting the æsthetic appetites of a few epicure among them!

**(6) PROBLEM OF HOUSING HOSPITAL
STAFF IN CONVENIENT PROXIMITY
OF THE HOSPITAL**

This problem exists in different degrees in all hospitals on the South Eastern Railway. Residential units for staff were not constructed on a planned and programmed basis. As and when the need arose, any available quarter of any type, located anywhere in the colony, was accepted for use by the Medical Department. The result is that different staff live at different sites in the colony. Staff rostered for duty for the night and early morning shifts and especially Nurses and Women staff, experience difficulty in reporting at their work spots in time, unless they find male escorts to accompany them. Great difficulty is experienced in summoning certain essential staff to the hospital during emergencies. This problem is being solved by exchanging medical staff quarters with quarters or other departments nearer the hospital.

In practice, this is a difficult proposition, as other departments and occupants of quarters are reluctant to suffer inconvenience by exchanging their quarters for others. This question had to be handled tactfully, both at the District Medical Officer's level and at the level of the Heads of Departments at the headquarters. Another method for overcoming this difficulty is to install Railway telephones at the residences of certain key staff, who can be summoned by telephone. In the case of hospitals which have ambulance cars, these are used during emergencies for picking up important staff who are unable to move quickly for want of proper conveyance.

This problem was kept in mind in planning the new hospital nearing completion at Bilaspur. A large open area round the hospital was ear-marked at the start for future quarters and other ancillary services. A similar blue print has been prepared for the new hospital at Waltair.

**(7) PROBLEM OF WATER AND ELECTRICITY
SUPPLY OF THE HOSPITAL**

Water scarcity in summer is fairly prevalent in many important colonies on the South Eastern Railway. The hospital obtains its supply from the general pool. When the supply position is acute, the hospital, along with other premises in the colony, gets only an intermittent supply of water. This causes serious dislocation of working of the hospital. This problem has been solved in the new Bilaspur Hospital by providing

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an independent open well within the hospital compound with a perennial source. It is also proposed to sink a suitable tube well within the hospital compound or very near it for augmenting this supply. An overhead storage tank for the exclusive use of the hospital will also be put up and direct supply will be arranged from this. Such an independent supply can easily be controlled according to the needs of the hospital. A good start has also been made in solving this problem in the newly opened hospital at Khurda Road.

Similar arrangements with regard to provision of a direct connection from the electric sub-station for supplying electricity would be ideal. This arrangement is likely to materialise for the new hospital at Bilaspur. A fool-proof arrangement, of course, will be to provide an emergency portable diesel electricity generating set for every hospital with 50 beds or more.

These are some of the interesting teething problems that were encountered by the Medical Department of the South Eastern Railway in expanding its hospital services. It will not be out of place here to recapitulate a sound piece of advice which I had the good fortune to receive from a retired Chief Medical Officer of the Southern Railway, with whom I had the privilege of being associated with during expansion of the headquarters hospital of the Railway at Perambur. He used to remark often that "In hospital planning, we should not leave behind anything for which posterity will blame us." These words ring true and should constantly be in the mind of all hospital planners. The other piece of advice that has struck my imagination was from one of my General Managers, who had a distinguished record of Engineering experience on Indian Railways. He used to say frequently—"I do not want hotch potch additions to hospitals. We must prepare a Master Plan, keeping in view the present and future needs and execute work in stages as and when required." This again is a

sound advice for future hospital planners on the Indian Railways.

One more important aspect of hospital designing, which I would like to bring out is the need for understanding and helpful co-operation between Engineering, Electrical, Tele-communications and Medical Departments in building a modern hospital. It is for the Medical Department to say how much of floor space is required and what spatial relationship different parts of the hospital should bear to each other. The Engineering Department has to work out how these requirements could be fitted into an overall composite architectural and structural theme. The Electrical Department has to design the interior lighting and power points in the most accessible and unobtrusive manner. The Tele-communications Department should provide the vital channels of communication which constitute the nervous system of the hospital. Each of these departments will have a great deal to learn from the other. An attitude of "I know everything, and there is nothing I can learn from you" will not be conducive to achievement of most gratifying results.

Progress is a finished product, wrought by unceasing blows from the hammer of intelligent effort, on the anvil of experience. Progress can be achieved in an appreciable measure if good team work is forth coming on the part of Doctors, Engineers and other staff. The invaluable experience we of the Medical Department of the South Eastern Railway have gained in designing hospitals is entirely due to the enlightened encouragement that was received by us from our last two successive General Managers, the willing and helpful co-operation of the Engineering, Electrical and Tele-Communications Departments, and last but not least, through the whole-hearted and enthusiastic participation of all Medical staff like Doctors, Nurses, Assistant Medical Officers and particularly our District Medical Officers.

SCIENTIST REPORTS NEW CANCER RESEARCH METHOD

A Chicago University professor reports a significant breakthrough in cancer research which involves a new and rapid method of first producing and then extinguishing breast cancer in rats.

The technique, outlined by Dr. Charles Huggins of Chicago University's Ben May Laboratory for Cancer Research, represents a number of "firsts."

- 1. For the first time, a way has been found to induce cancer in all laboratory animals tested, something not previously possible.
- 2. For the first time, a way has been found to extinguish, not just suppress, cancer in laboratory animals.

3. Producing and eradicating the cancer takes just over three months. Previously in work with mice it took up to two years to demonstrate this.

4. Most important, it offers science a "ready-made" tool to evaluate drugs for their anti-cancer effect against breast tumours in human beings, where time is important.

Dr. Huggins reported on the new method at a meeting of the National Academy of Sciences.

Huggins said a single feeding by mouth of 20 milligrams of the compound DMBA to a strain of albino rats produced mammary cancer in all 500 by the time they were 50 days old. Some of the rats developed the cancer within 15 days. At age 65 days, they were given the ovarian hormone progesterone, and by age 90 days the tumours had disappeared in two out of 10 and eventually in all the rats. Rats given injections of pituitary hormones at age 65 days, or made pregnant, experienced very rapid spreading of the breast cancer.

Huggins said the method is a "wonderful tool" to test both carcinogens (cancer causers) and drugs for their anti-cancer potency. He said screening of cancer drugs might be speeded several hundred fold by the new method.

* * * * *

RADIOISOTOPES USED TO PREDICT HEART DISEASE

A method that may make it possible to predict a person's susceptibility to heart attacks, even when no symptoms of such a condition are evident, has been developed by an American physician.

Dr. Philip C. Johnson of Baylor University, at Houston, Texas, injects radioisotopes into the heart to test the rate at which the blood flows through it. In a diseased heart, the blood flow is decreased by as much as 50 per cent, he says.

The need for a simple diagnostic device in this field has been very great. At present the determination of blood flow in a diseased heart involves a somewhat hazardous and expensive procedure which requires the installation of tubes or catheters into the heart. Dr. Johnson says that his method is simple, non-harmful, and no more difficult to do or to interpret than a simple X-ray examination.

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Each year in Europe, between one-ninth and one-quarter of all workers have a disabling accident. The proportion varies naturally in different places and different industries. Out of 10,000 workers, from one to four - and sometimes as many as 10 - die as a result of accidents.

In the United States of America, out of a total of 91,000 accidental deaths from all causes, 14,000 are due to industrial accidents. In the same country, two million workers annually have occupational accidents resulting in incapacity for work. The number of work days lost in this way was estimated at 230 million in 1959, and the corresponding economic loss at \$4,200 million.

In France, a serious accident, causing death or permanent invalidity, occurs every two minutes, and even a small country like Switzerland has an annual toll of more than 200,000 occupational accidents of which between 300 and 400 are fatal. The number of work days lost annually is estimated at 8.5 million.

AN analysis of all types of industrial accident shows that only one in eight is caused by machines. Vehicles, electricity, sources of heat and similar causes account for one-quarter of the total. More than half is made up of what a British expert, Mr. W. T. McCullough, Chief Inspector of Factories, has called the Big Five: (1) falls from a height; (2) falls on the level; (3) handling of materials, etc.; (4) falling objects; (5) hand-tools. One technician has even claimed that today there are fewer risks in manufacturing nitro-glycerine than in transporting a heavy crate.

"DANGEROUS SITUATIONS"

"When dismantling a bench on which for years a large gas-ring had been fixed, it was found that underneath the asbestos sheet on which the burner stood, the wood of the bench was charred right through. The asbestos had been fixed tightly to the wood and had conducted so much heat to it that a sudden draught of air could easily have started a fire."

Every day from the 110 factories and works of one of the largest chemical firms in Britain, a sheaf of pink report forms arrives on the desk of Mr. J. St. Brown, who is head of its Safety Division. Each reports a "dangerous occurrence" in which an accident might easily happen. Copies of these reports are circulated to the Safety Committee in each of the company's factories together with precise recommendations in each case. For the situation described above

the directive was: "A free space should always be left between the asbestos sheet that isolates a heating system and any inflammable material that it is supposed to protect".

The results of this company's far-sighted policy speak for themselves. Among the 73,000 workers in the 110 factories for whose safety Mr. St. Brown is responsible, there were in 1959 only 386 accidents causing temporary absence from work, nine serious accidents and five fatal accidents. These were the lowest figures in the company's history, and showed more than 80 per cent improvement on the 1945 figures and 25 per cent on those for 1957. Such spectacular successes in the fight to reduce accidents are unfortunately rare.

THE NEED FOR BETTER STATISTICS

On the national scale it is much more difficult to collect such exact information as this. As Mr. Marcel Robert, Chief of the Occupational, Safety and Health Division of the International Labour Organization (ILO), said recently: "In compiling statistics, an accident is generally attributed to only one cause, the most obvious one. In the great majority of cases this is completely misleading because potentially important accident factors are left out of account".

Nevertheless statistics are valuable, and are indeed indispensable for measuring the success of preventive efforts and discovering the weak points to which these efforts should be directed.

One ILO report published shortly after the last war showed that during the years 1939—1945 industrial accidents in the United States of America and the United Kingdom had killed more people than the war itself. Yet these two countries were already at that time leaders in industrial accident prevention.

A study of industrial accident rates since 1938 leads to the unexpected conclusion that in many industrialized countries the present situation shows little if any improvement over that existing before the war. Even in the United States and the United Kingdom the improvement between 1938 and 1958 is only 38 per cent.

In countries which are in the process of rapid industrialization the problem of accidents has been growing increasingly important.

In India, for instance, the accident rate has increased from 100 to 240 between 1938 and 1958.

MAKING ACCIDENTS IMPOSSIBLE

Two different tendencies have developed in efforts to improve industrial safety. One is towards more and more detailed legislation and measures to improve the physical conditions of work. An English safety engineer recently said: "It is my job to see that even the clumsiest and least intelligent of our factory hands runs no risk of an accident".

The other tendency is to lay stress on the importance of education. According to partisans of "Education first", the evidence shows that a "human factor" is involved in more than 80 per cent of occupational accidents, and that therefore preventive measures should rather be directed towards the worker. Moreover, they say, when legislation and inspection procedures become too complex and cumbersome, they are no longer respected.

These two approaches are of course complementary. No accident is entirely due either to an outside cause or to a human failing. Most experts on the question

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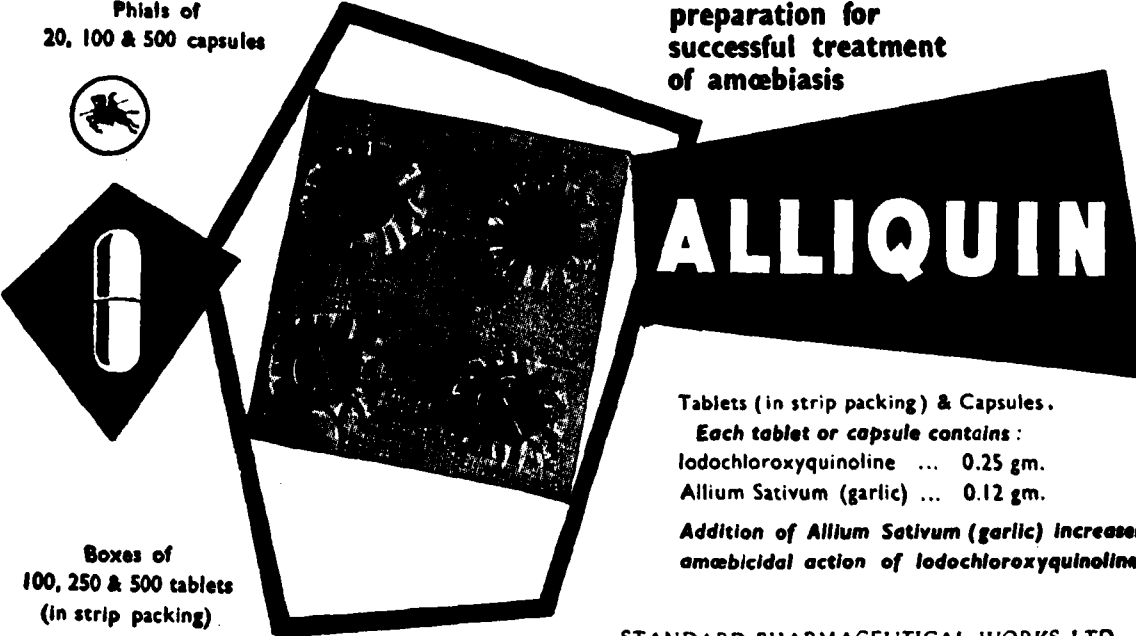
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agree today that industrial accidents, like all other accidents, have multiple causes.

“Most of these”, says Professor Victor Raymond, Medical Adviser to the French *Institut National de Securite*, “are potential causes, they exist only as possibilities. No accident will actually happen unless in one given place and one given moment, the different potential causes come into operation together.”

One day at a certain moment a man falls into a hole. The hole is certainly a cause of the accident, for had there been no hole there would have been no accident. Yet it is only a *potential* cause, for plenty of people pass by unprotected holes without falling in. The man may also carry within himself certain potential causes of accident—for instance, a liability to feel dizzy, or to day-dream—but this does not mean that he falls into every hole that he comes to.

THE “FATAL ACTION”

For the accident to cease to be potential and become actual, there must be this conjunction between the victim and the material cause, which supposes a precipitating factor. This factor, which determines or precipitates an accident, may be independent of the victim, as for instance in the case of a falling stone or other object, a plank that gives way, or a machine that breaks down. But in a large number of cases, this factor is simply a movement or act of the victim himself. For this, Professor Raymond has coined the phrase “*le geste nefaste*”—the fatal action.

Most frequently, this fatal action is an uncorrected conditioned reflex. By their very repetition, many work movements become stereotyped. The man becomes a kind of robot, slave of the machines and objects he works with. His work movements become mechanical, and always follow the same pattern. Now suppose that the machine or the objects the worker is concerned with suddenly present some departure from the usual pattern. Unless the worker's conditioned reflex is quickly corrected, the “fatal action” will be made.

Fortunately for him, the human being possesses protective mechanisms against these “fatal action”. First there are the primary reflexes which produce an “instinctive” withdrawal from a danger usually perceived through the sense of touch. Conditioned reflexes can also produce similar protective reactions.

“Once bitten, twice shy” says the proverb—reaction to fire is the classic example. A child who actually touches a burning object will withdraw his hand by a primary reflex action. An association between the sight of fire and the sensation of burning is established and a conditioned reflex is created which lasts throughout his life. Whenever he sees a burning object getting too close, he withdraws.

Such protective reflexes can be developed by creating associations between a danger and certain sights and sounds—warning by sirens or bells, and, very important, notices and labels.

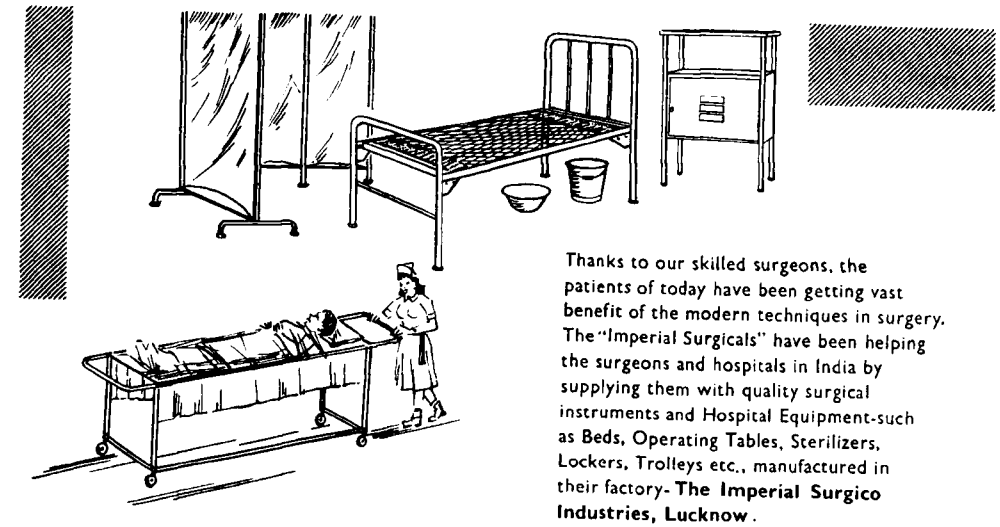
Finally the instinct of self-preservation that everyone possesses can be strengthened and trained so that it corrects, checks or co-ordinates habitual actions and prevents them from becoming “fatal actions”.

BUILT-IN SAFETY

Unfortunately this instinct of self-preservation cannot be relied on absolutely—there will always be occasional eclipses. Much can be done, however, to limit their effects by technical and mechanical safety measures. To be effective such measures should protect all workers alike and should require no effort or co-operation from the individual. They are based on the elimination of all risk! An example is the prohibition of the use of white lead in paint, which has automatically prevented white-lead poisoning among the people working with paint.

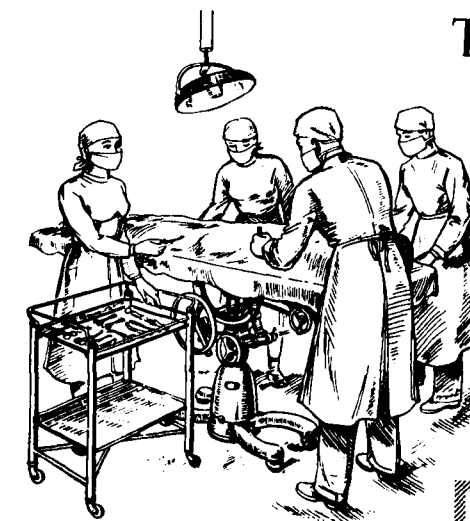
If safety devices are built into machines, fewer precautions are needed when using them. Of course the workers know about these safety devices and their role, and it sometimes happens that they resent them because, they say, they complicate their work. Therefore they sometimes remove them or put them out of action, temporarily or permanently. Machines should always be provided with an automatic stop that operates whenever its safety devices are not working. The less such a device interferes with the worker's habits the more easily it will be accepted and used by him.

These safety measures are collective in nature and do not require the co-operation of the individual worker. There are others which do require his more or less active participation. As we have seen, this is often problematical and such measures, even though necessary, are therefore less reliable.



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It is difficult enough to obtain even the worker's passive co-operation, for instance, in following certain rules, or going for a medical check-up. If he is asked to take more active precautions, like wearing gloves, special glasses or a mask, experience shows that the results are usually unsatisfactory.

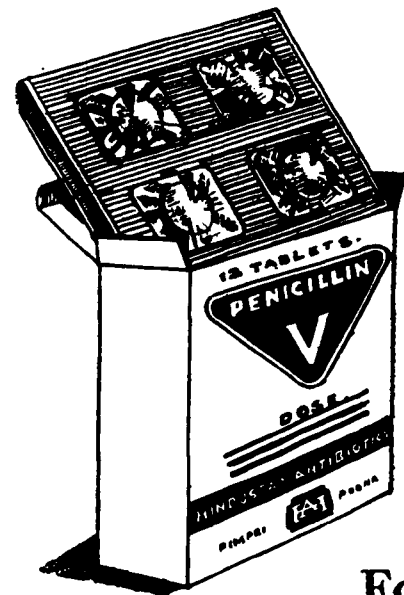
It is of the first importance that each worker should know and understand the risk to which he is exposed. Instructions must be complete, detailed and precise in order not to create simply a vague, uninformed fear of accidents. For example, everyone knows vaguely that electricity is dangerous, but what is important is to know how dangerous and in what way. It is not enough for someone to know the dangers of lighting, or of high tension currents, if he does not realize the

dangers of the common 110 volt or 220 volt household electricity supply.

Again, it is not enough just to tell people about such risks—they must really understand their nature. It is for this reason that too much dependence cannot be placed on rules, warnings, "forbidden" notices, etc. They become so familiar that after a while they have no further effect in preventing the "fatal action".

None of these "individual" safety measures can be really effective unless the person it is intended to protect is made to feel a partner in the scheme, and this will depend largely on the attitude of the works manager. He must set the pace. If he is genuinely concerned about safety measures, the engineers and foremen will follow suit, and the accident rate will soon reflect the success of their combined efforts.

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RED LIGHT—STOP ROAD ACCIDENTS

In several countries where major communicable diseases have been brought under control, accidents are the leading cause of death at ages between 1 and 45 years. They cause about one-quarter of all deaths. One-half of these accidental deaths happen on the road. A thousand people a day die on the world's roads.

It is true that there are more than 100 million four-wheeled vehicles on the roads in the five continents, and it is estimated that there is a similar number of two-wheeled vehicles.

A tremendous increase took place after the Second World War. From 1938 to 1959 the number of cars in France rose from 2,250,000 to 5,650,000 and of motorcycles from 500,000 to 6,400,000. In the United States there were 29 million cars in 1938 and 70.5 million in 1959. During the last six years the number of American car drivers has risen by 42 per cent and the total mileage covered by 68 per cent.

EVERYWHERE in the world, this state of affairs has stimulated efforts to reduce road accidents. The press, television, radio and the cinema are daily trying to make people conscious of the dangers resulting from increased traffic and speed. Some very ingenious methods have been developed.

Evening in a Dutch village. Three grey cars and two ultramodern caravans pull up for the night. In the morning a loudspeaker begins broadcasting waltzes, popular songs and jazz tunes. Is it a theatrical touring company? A publicity campaign?

Soon there comes this announcement: "This afternoon, an entertainment for the children. At 6 p.m. choral singing and in the evening a film-show—no charge for admission. We ask only one thing: help us in our campaign!"

So it's a publicity campaign after all—but in aid of road safety. In the best Flemish tradition, the Netherlands Association for the Prevention of Road accidents has been organizing travelling fairs which go from town to village with films and brass bands, offering free of charge to all car-drivers, motor cyclists, cyclists and pedestrians the one "accessory" that is absolutely indispensable yet which they so often forget—safety.

As happens every quarter, there is feverish activity in the Road Section of the Royal Society for the Prevention of Accidents in Great Britain. The end-of-year Road Safety Planning Guide must be sent off in time to the 11 regional offices in England, Scotland and Wales and, more recently, in Northern Ireland. Through these offices the 1,130 Road Safety Committees in the United Kingdom will receive the

educational and publicity material for the fourth annual road accident prevention campaign. For the last quarter of 1960 the theme was "The Hours of Darkness". Three posters (one intended for pedestrians, one for car-drivers and one for users of two-wheeled vehicles), rhyming tags, paper-knives with slogans, lecture texts, the latest statistics on night accidents, pamphlets, strip-cartoons, and lists of films on accident prevention—a mass of material—prepared with one aim in view: to reduce road accidents.

SAFETY-BELTS

In Sweden the NTF (National Association for the Prevention of Road Accidents) has won another victory. In September 1959, 27 per cent of Swedish cars were equipped with safety-belts; in 1960 the figure rose to 40 per cent. The biggest motor-car manufacturer in the country, Volvo, is to provide safety-belts in all its cars, and SAAB, the second biggest will fit seats to which they can easily be attached by the buyer. Most importers of foreign cars are considering providing seat-belts free of charge.

"If a tyre blows out as you are driving and your car starts to zigzag dangerously on an empty road, take your foot off the accelerator, put your hands behind your head, and on no account touch your brakes. Your car will automatically resume a straight course." This somewhat surprising piece of advice is but one of many given in the Advanced Driving Course held by the French Prevention Routiere (road accident prevention).

Even a careful driver who duly follows the Highway Code may not know what to do if a child suddenly

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SOUTHERN RAILWAYS MAGAZINE

runs into the road 20 yards ahead, or if his car skids on a slippery surface. The three final theory lessons of the Course will teach him about his reactions, the effects of fatigue, stimulants, tranquillizers and alcohol.

There are already encouraging signs of improvement following these different efforts. The number of children killed in traffic accidents in Great Britain has fallen considerably. In the United States of America and several European countries, accidents in towns, particularly those involving pedestrians, have shown a consistent drop.

Results like these may be attributed to improved regulations, police action of an educative rather than repressive character and the excellent work of road safety councils, automobile clubs and similar bodies.

But much remains to be done. Among the more urgent steps are a general adoption of compulsory safety education in schools, better co-ordination and unification of public and private efforts for accident prevention, and much more money for research.

This last point deserves particular attention. The cost of road accidents in 1959 amounted to \$6,200 million for the United States alone and £100 million for the United Kingdom. Fatal accidents made up only 3 per cent of these figures. Clearly then, from the economic point of view, it is important to cut down all accidents, whether serious or not.

AN INTERNATIONAL HIGHWAY CODE

Leaving aside humanitarian considerations, money

spent on accident prevention brings in a handsome financial return. It is an investment which should attract much more government funds than it does.

This being so, very little research is being done to discover the basic causes (whether material or human) of road accidents to analyse the circumstances in which they occur. The partial success achieved in accident prevention is largely based on empirical methods. Further progress will depend on a thorough analysis of every aspect of road accidents.

Pioneer work has been done in some countries, but the results are not widely-enough known. There is also an International Road Safety Organization but it has only 13 member countries, all in Europe, except Canada, Chile and Morocco. The big powers like the United States of America and the USSR have not yet joined.

Work on a unified international Highway Code is still unfinished. Accident statistics—which are essential to proper safety measures—cannot be compared among countries since there is no universally-accepted basis for compiling them. Experiments on revolutionary first-aid and accident prevention methods are carried out independently of one another.

We must realize that in this day and age, road accidents are a world-wide scourge. They must be fought as the major diseases are fought, by world-wide co-operation.

Enzyme Found Effective against Dangerous Blood Clots

Dr. Eugene E. Clifton of the Cornell University Medical College in the United States has succeeded after a seven-year study in isolating an enzyme which may be the long-needed substance that dissolves human blood clots that have formed and threaten death.

The enzyme, which is found in human blood, is called fibrinolysin. While Dr. Clifton and his associates have given injections of fibrinolysin to only 45 men and women suffering from critical heart ailments, 39 survived. The remaining six were in a state of

shock or of a hopeless heart condition before appearing for treatment. Dr. Clifton said recently that injections of fibrinolysin would usually be given only in an emergency and that, although the enzyme might save many lives, it would not always be successful.

It is hoped that fibrinolysin will also be helpful in other ailments besides heart conditions that involve blood clots. Among these are phlebitis, an inflammation of a vein, to which young mothers are sometimes subject.

Education, the Best Shield Against Accidents

Dangers surround a child from the moment it draws its first breath. The whole of human life is indeed, in a sense, an unceasing struggle against danger.

Most accidents are the result of unnecessary risks taken either because of faulty judgement, or, what is worse, through lack of physical fitness or simple ignorance. Education, both physical and mental, is certainly the best safeguard against this murderous affliction called accident.

DURING his first year, a child is incapable of judgement. Unable to do anything for himself, he depends entirely on his mother. At first then it is the mother who has to think and act for him, and protect him against all the dangers to which he is exposed.

There is one particular danger against which the mother must be constantly on guard—suffocation. The first precaution is to make sure that within the baby's reach there is nothing that might interfere with his breathing. Eiderdown pillows should never be

tolerated. In recent years, a new danger has appeared in the shape of plastic curtains, trimmings, etc. Static electricity may cause this filmy substance to cling tightly to the face of a new-born child, blocking its nose and mouth and suffocating it. In the United States of America, plastic bags bear a notice drawing attention to this danger and warning parents to keep them out of baby's reach.

Food is the second great cause of suffocation. Even an overworked mother should realize that she is running a terrible risk if she leaves her baby alone to

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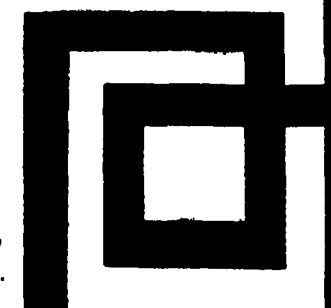
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suck his bottle. Thirdly, far too many mothers appear not to know how easy it is to stifle a baby sleeping in the same bed with them.

* * *

While a mother should always protect her child against danger during the first months of his life, it is very important for her to start to let him fend for himself when he is about one year old. Little by little she should lose the habit of doing things for him, of fussing over him. A mother who is over-worried and over-careful is perhaps the child's greatest danger; for the moment he escapes her supervision—as of course he will do, sooner or later—he is likely to assert his freedom by doing some forbidden and perhaps fatal action.

One precaution against this instinct for self-assertion is to make the child's environment as safe as possible. A French doctor, Philippe Gravel, stresses in this context that psychological as well as physical factors need to be taken into account.

For example, a fall down a staircase, he says, may be due to the pattern and colour of the carpet failing to provide sufficient contrast between one step and the next so that it is difficult to see where each begins and ends.

LEARNING TO KNOW DANGER

But passive protection is not enough: it is necessary for the child to learn to understand the risks he runs. Adults frequently make one of two mistakes: either they credit the child with more intelligence than he possesses, or they assume he is quite unable to think for himself. In both cases they fail to understand that they are dealing with a mind and a body in constant development.

Between 12 and 15 months the child is absorbed in examining the world around him. He will explore the house. He will try to touch everything he comes across, particularly if it is on a level with his eyes. Almost everything he will try to put in his mouth.

Around two, he becomes capable of opening a door. He likes to lift up a lid and empty a box, only to fill it again afterwards. He has little idea of distance and tries to climb here, there and everywhere. To play with water becomes a favourite pastime.

Around three, he is surer of his movements and likes to go walking. He learns to distinguish right and left. He enjoys feeling responsible and making him-

self useful. At the age of four, he thinks of nothing but running about and playing ball. He can ride a tricycle and climb trees. He can concentrate mentally for longer periods.

Should all this exploration and these increasingly dangerous activities be prohibited? "No," says Monsieur Robert Salle, head of the teaching and publicity section of the French *Institut National de Securite*. "You cannot base accident prevention on the principle of taking no risks. In life you get nowhere if you don't take risks."

Safety education should accordingly be pursued along two lines:

- (1) teach the child to distinguish between the risks he may take and those he had better avoid;
- (2) teach him the best way of dealing with the dangers that cannot be avoided.

If parents are to provide their children with a judicious blend of advice, reprimand and prohibition, they must learn to know their children better. They should, for instance, admit once and for all that, as the statistics show, boys are more liable to have accidents than girls. They should not take this as an excuse for resignation or inaction but rather as a guide to where preventive efforts should be concentrated.

CRITICAL MOMENTS

An important factor in accidents is the time of day. The survey carried out in 1955 in Stockholm by the paediatricians of the Swedish Committee for the Prevention of Accidents in Childhood showed that a large number of accidents occurred between 10 a. m. and 8 p. m., with a slight increase from 11 a. m. to midday and a very marked increase between 3 p. m. and 6 p. m. In Stockholm, these are the hours immediately preceding the midday and evening meals, and are probably also those during which children are less well supervised. Hunger and fatigue, particularly towards evening, make the children more accident prone. Similarly in France it was noted by Dr. Gravel that under the age of 15, accident occur most frequently around 5 p.m.

The time of year also plays a part. According to Dr. Barbara J. vanden Berg, summer is the season in which most of the accidents among children between the ages of 1 and 14 occur in the Netherlands.

A pilot study carried out in Columbia (United States of America) on children who repeatedly suffered accidents revealed a number of psychological factors. It was found that hostility to the environment, a conflict with the parents, or simply a state of tension within the family may create a predisposition to accidents, also that a child who strains his powers in order to gain acceptance by a group of older children may take dangerous risks.

In different regions or countries, children are exposed to different dangers. In Scandinavia and in the Netherlands, drowning is the most frequent cause of accidental death among children of pre-school age. Among home accidents in Great Britain, burns are second only to suffocation.

In all countries where motor traffic is intense, it is responsible, perhaps not for the most frequent, but certainly for the most serious accidents. In Sweden, 40 per cent of childhood accidents occur in or around the home and only 10 per cent occur in traffic—yet 34 per cent of accidental deaths among children are due to traffic. In the Netherlands, among children of pre-school age who are hurt in a traffic accident, most are on foot.

EDUCATING THE PARENTS

It has often been said that the education of the children starts with the education of the parents. This is especially true in matters of safety. "If I had only known..." says the mother in despair after her child has been crippled or killed in a traffic accident. Why did she not know that a child under five should never be allowed to venture alone on the road?

"But," she says, "my little boy was playing quietly on the footpath and all of a sudden he rushed into the middle of the road after a ball..."

She should have known that there are a number of simple things a four-year-old can be taught. According to British experts, a "kerb drill" to teach children how to cross a street has already saved thousands of lives in the United Kingdom during these last 30 years. It goes like this:

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At the kerb halt!
Look to the Right, look to the left,
Look to the Right again,
If all clear, Quick March!

This, of course, would need modification in countries where traffic goes on the right.

LEARNING ROAD SAFETY AT SCHOOL

Once a child goes to school, there are more opportunities for safety education. But instead of relying exclusively on the teacher, parents should increasingly take part in this aspect of their child's upbringing. It has been quite clearly shown that in a factory where the manager is not interested in safety there is a high accident rate, despite the observance of rules, the goodwill of workers and the devotion of engineers. The same applies in a family where the parents are not sufficiently concerned with their children's safety.

In many countries, traffic and safety regulations are part of compulsory schooling. In England, school legislation has so far not made this development possible, but through the combined efforts of local safety committees and various sections of the Royal Society for the Prevention of Accidents (ROSPA), many teachers include traffic safety in the curriculum.

ROSPA House, in the heart of London, has a large exhibition hall which is visited every year by thousands of children. With its working models, its many tests, its bicycles running on endless belts and so forth, ROSPA House is a real Arabian Nights palace for modern boys and girls, and gives them most valuable training as pedestrians, as cyclists or as the crack motorists of tomorrow. Unfortunately, such centres are too expensive to be set up everywhere.

In the Netherlands and in Sweden, car races on miniature tracks are a way of giving serious training to thousands of children. Furthermore, Swedish schools include the highway code and safety education as a compulsory subject.

In France, the *Prevention Routiere* makes great efforts to reach the children. In addition, a regular check on bicycles is carried out in schools.

FEAR IS A BAD TEACHER

According to Monsieur Robert Salle of the French *Institut National de Securite*, safety education must not be based on fear:

"We all know what a deep impression terror stories can make on the young mind. The child is prepared

to accept them as real, even if the stories speak only of imaginary dangers. We also know that childhood terrors may make a lifelong impression, even though, during adolescence and later, efforts may be made to overcome the bad effects.

"This being so, it would be just as stupid to frighten a child with real dangers as with imaginary ones. What is needed is to get the child to acquire habits of simple self-defence."

Safety education must therefore be considered part of general education and should certainly be included in the school curriculum. It is also an essential part of that "savoir vivre" that the child acquires mainly from its parents.

The motorist or the cyclist driving in town traffic must have his eyes everywhere, right, left, in front, and, with the help of his mirrors, even behind. This kind of attention is exactly that of an animal, or a man for that matter, moving through a probably hostile forest. Schooling on the other hand tends to develop *concentrated* attention. A strong case can be made out for training this diffuse kind of attention and one of the best ways of doing so is probably through team games and sports.

PRACTISING HOW TO FALL

Sport indulged in reasonably may help young people to avoid traffic accidents, not only because it sharpens reflexes, but because it accustoms to the observance of rules, and encourages a well-balanced way of life, healthy food habits, and moderation in drinking.

There is no doubt, moreover, that the best way of substantially reducing the number of drowning accidents is to teach swimming at school.

As regards falls, an analysis of industrial and home accidents shows the usefulness of distinguishing two kinds: falls on the level and falls from a height. The large number of falls in all human activities and the statistical predominance of falls on the level suggest that one remedy might be to give young people the right kind of physical training—perhaps including elementary Japanese wrestling (judo) and simple acrobatic exercises on the ground.

There is no doubt that accidents are fewer following any efforts to make children realize the risks they are running and to teach them how to meet the dangers they encounter. Education offers the only hope of over-coming, little by little, this great malady of our times without sacrificing other human values.

Northern Railway Hospitals — Delhi and Jodhpur Divisions

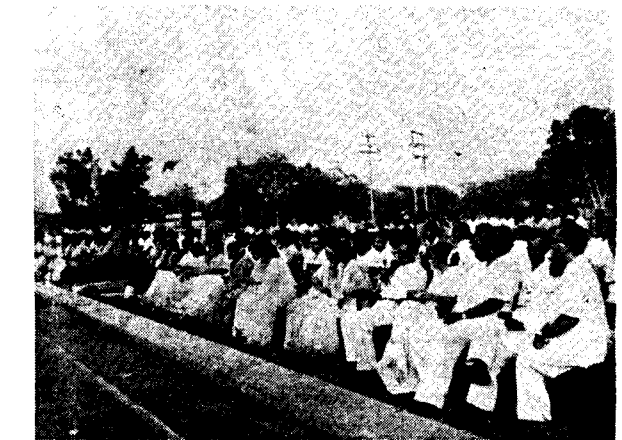
THE history of Northern Railway Hospital, Delhi Main, dates back to the year 1931 when the then District Medical Officer shifted his headquarters from Saharanpur to Delhi. The present site where the hospital is situated used to be occupied by the old B. B. & C. I. Railway quarters and Guards & Drivers' Running Room. To begin with a modest start was made with the provision of 30 bed ward, outdoor department and an administrative block having D.M.O.'s Office.

During the course of time and in keeping with the declared policy of the administration to extend medical facilities for the Railway staff and their families, this institution has developed and at present it provides the following facilities:



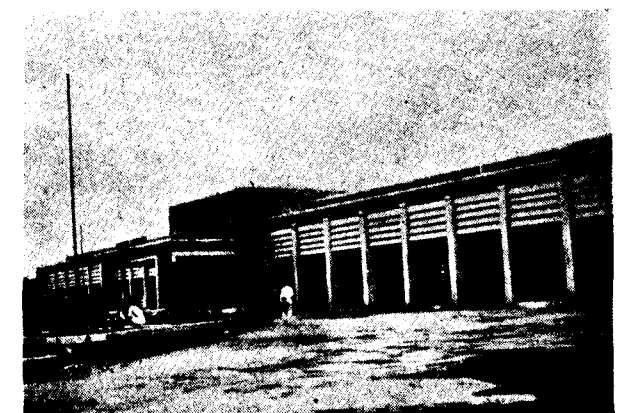
- (a) No. of beds 67 plus 3 beds for T.B.
- (b) The outdoor department has been augmented by provision of Chest Clinic under the charge of a Tuberculosis Specialist.
- (c) The following X-ray & Electro-therapy apparatuses are provided:—

X-ray Plant 500 M. A. Unit	One
Short Wave Diathermy Apprts	One
Infra Red -do-	One
Ultra Violet -do-	One



In addition to class IV staff, the hospital is maned by the following staff:—

D. M. O.	One
A. M. O.	One
Asstt. Surgeons Outdoor	Three
Lady Asstt. Surgeon	One
Asstt. Surgeons (Indoor)	Two
Asstt. Surgeon Chest Clinic	One



Relg. A. S.	Five
Asstt. Surgeon (Lab.)	One
Asstt. Surgeon (X-ray)	One
Asstt. Surgeon (Ophth.)	One
Sister I/C	One
Nurse 'A'	Eight

Nurse 'B'	Two
Dispensers	Six
Rest Giver Dispenser	One
L. R. R. G. DPR.	One
Relg. Dispensers	Two
X-ray Tech :	One
Lab. Asstt.	One
Optician-cum-mechanic	One
Midwife	Three
Midwife R. G.	One
Midwife Relg.	Two

The following statistics will show the quantum of work carried out during the year 1960—61 :

- | | |
|---|-------------------------------|
| 1. No. of outdoor patients treated | New 56355
New & Old 214808 |
| 2. No. of indoor patients treatment | 1825 |
| 3. No. of surgical operations performed | 337 |



From Aug., 1960, a Family Planning Clinic has also been started and it is run under the direct supervision of the lady Assistant Surgeon. The clinic functions once a week and is helped by the services of a committee of ladies—families of Rly. officers—who take keen interest in this social work.

A number of physical fitness examination in respect of candidates and employees is being performed at this hospital and it was noticed that the staff requiring glasses had to go to the optician where they had to pay exhorbitant charges for supply of spectacles. In order



to over-come this difficulty an optical centre under the charge of an *Optician-cum-mechanic* has been started at this hospital w.e.f. 2—7—1960 where glasses are supplied to Railway employees and their families on no profit—no loss basis.

NORTHERN RAILWAY (JODHPUR DIVISION)

Northern Railway Hospital situated in the Railway Colony, Jodhpur, is a source of relief and benefit to the Railway patients. It is endeavouring to add to the increasing medical facilities of the Railwaymen for whom it is intended by the indefatigable efforts and care of the patients, their diagnosis and treatment. Utility of the hospital medical facilities at the Hospital by an ever increasing number of patients shows the importance of the services done by the Hospital to the Railwaymen.



BRIEF HISTORY

In ex-Jodhpur Railway there existed a small dispensary for the medical aid and services to Railway Employees near the station. In the year 1933 when Mahatma Gandhi Hospital (then Windom Hospital) came into being with an accommodation of 500 beds, equipped with all modern facilities of diagnosis and treatment, the existence of the small dispensary being considered of no use and was consequently closed. Railway Employees and their families, being part and parcel of Jodhpur State Services, used to enjoy all facilities from the very hospital.

With the merger of State Railways in the Indian Railways in the year 1953, Jodhpur State Railways became a part of Northern Railway forming a separate division of the same. By being so all Railway Workers became the Central Govt. Servants, under



the Ministry of Railways of the Indian Union. As such, they were accorded the medical facilities after the time of other Divisions. Consequently, the old Railway Dispensary re-started functioning under the administration of Assistant Medical Officer, with two Assistant Surgeons attached to him, for In-patient treatment, Railway had its fixed beds at M. G.



Hospital, for which the Administration was paying Rs. 8,400 per annum to the Hospital and Rs. 100 and Rs. 60 to the Principal Medical Officer and the Physician respectively, as an honorarium.

With the increasing demand of medical aid, the

necessity of establishment of a separate Hospital was felt. The Railway Board, accorded its sanction for the construction of a 25 bedded hospital and it was on 15th day of April, 1956, that the foundation stone of the Northern Railway Hospital was laid down by Shri B. D. Gaur, the then Divl. Supdt. of the Division.

The magnificent building raised, furnished with all modern equipments by the end of June, 1958 and was inaugurated by Dr. B. Lal, the Chief Medical Officer, Northern Railway, on the 18th day of July, 1958.



GENERAL ADMINISTRATION

The Hospital is functioning under the Administration of the Divisional Medical Officer, assisted by five Doctors of the rank of Assistant Surgeon, Grade I; with one Lady Assistant Surgeon. The Hospital covers an area of 229½ miles and is looking after a population of 11,169 Railway Employees, and their families. It has got an accommodation of 25 beds, which are distributed as—20 for General, 4 for Maternity and One for T. B., or Isolation Patients. In addition to this about 400 patients attend the Out-patient Department of the Hospital every day. A fully equipped operation theatre, Pathological Laboratory, 200 MP X-Rays, Infra Red and Short-Wave Diathermy machines have been provided to help the diagnosis and treatment of the patients.

CHEST CLINIC

The Chest Clinic came into existence in 1953 with the aim of:—

- (i) Early diagnosis of the disease.
- (ii) Isolation and treatment of infected cases.

(iii) Follow-up and Checks-up of arrested cases and contacts.

(iv) Educating the Railway public for safe-guarding themselves from the infection.

With the installation of X-Rays Machine, and full laboratory amenities, the diagnosis, treatment and follow-up of T. B. cases among the Railway employees and their families became easy. The clinic as a unit of the Hospital look after the interest of 11,169 Railway Employees and their families of the Division. The incidence of the disease was detected amongst 0.40% of the employees and 0.44% of the families. Out of these after diagnosis and treatment 0.32% were sent back to duty and 0.38% of the families were cured. 0.26% of these cases were sent to various sanatoria for treatment. The mortality rate of these cases were 0.01% and 0.14% of the employees and families respectively.

The Clinic is making every effort for the easy diagnosis and treatment of these patients, complete check up of the contacts, and providing the protection to the susceptible cases by B. C. G., in collaboration with the Civil authorities. Visual education is imparted by arranging the film shows and talks off and on.

T. B. WARD

The new T.B. Ward is under completion and with the opening of the same within a couple of months,



extra accommodation of the indoor beds will be available to these cases. The 10 bedded ward with a separate out-door attached to it exclusively for the T. B. cases will be added to the existing facilities of the Hospital and will be a great help to the employees and their families.

MATERNITY & CHILD WELFARE

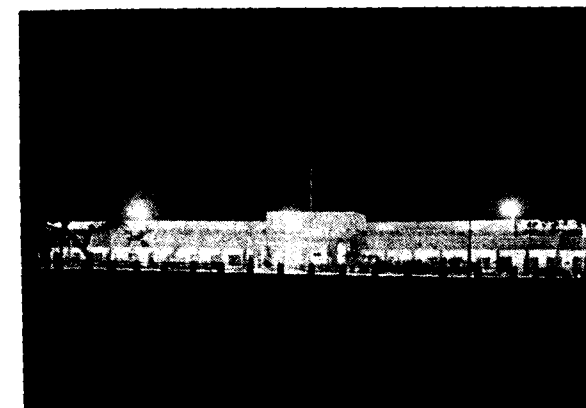
The maternity and child welfare clinic is working under the Lady Assistant Surgeon of the Hospital, where the Prenatal and post-natal clinics are held to guide the expectant mothers. It has been noted that a growing sense is developing amongst the Railway Workers to utilize the facility.

FAMILY PLANNING

Due to the increasing emphasis of the family planning education by the Union Government a family planning centre has been opened in this hospital to accord the Railway Employees and their families, the knowledge of family planning. The lady doctor has specially being trained for the same at Delhi recently.

LIBRARY & GENERALS

The Hospital has a small and concised library of its own having about 200 books on all important topics. It is contributing to the 'Practitioner' and 'The British Medical Journal' so that the doctors



may be kept paced with the recent advances of the medical science.

CLINICAL MEETINGS

The meetings are held at the Hospital and the Doctors are encouraged to take part in the discussion on cases. The Doctors from the Health Units are also called periodically and the instructions about the latest methods of diagnosis and treatment are imparted by the Divl. Medical Officer. The eminent doctors of the local Civil Hospitals are also invited to these meetings.

A YOUNG SOVIET DOCTOR OPERATES ON HIMSELF

Leonid Rogozov, a physician at the Soviet Novo-Lazarev Antarctic Research Station, has performed a successful operation for appendicitis upon his own person. He is now recovering, starting to walk and feeling well.

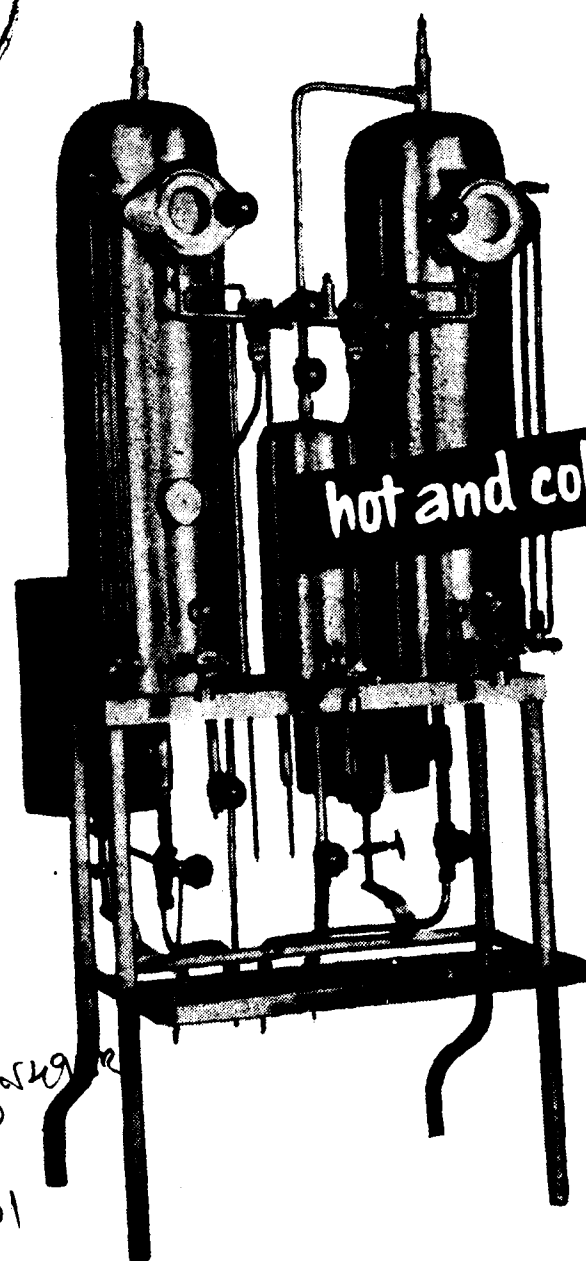
His assistants during the operation, which lasted for nearly two hours, were Alexander Artemyev, a meteorologist, and Zinovy Teplinsky, a mechanic.

On April 30 Leonid Rogozov found he had an acute attack of appendicitis, Vladislav Gerbovich, the Novo-Lazarev station chief, reports. The fever and vomiting demanded an urgent surgical intervention. The violent blizzards in the Princess Astrid Coast, where the station lies, ruled out the possibility of calling out a plane from Mirny, the South Polar Observatory.

At night Leonid Rogozov operated upon himself, using a mirror. He cut up his own abdomen and removed the appendix, in spite of the severe pain. His gestures were measured and precise. With the appendix removed, it became clear that the slightest delay in operating might have had a disastrous effect.

Leonid Rogozov is 26. He graduated from the Leningrad Medical Institute in 1958 and worked for nearly two years at the Institute's Department of Surgery before sailing for Antarctica.

The Soviet Novo-Lazarev station, lying in the Schiermacher oasis in the Queen Maud Land, has a staff of twelve explorers.



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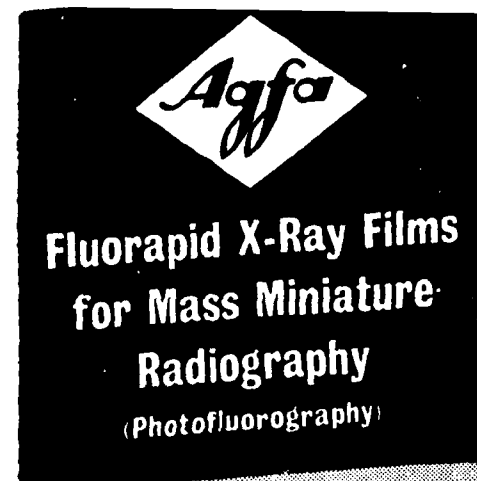
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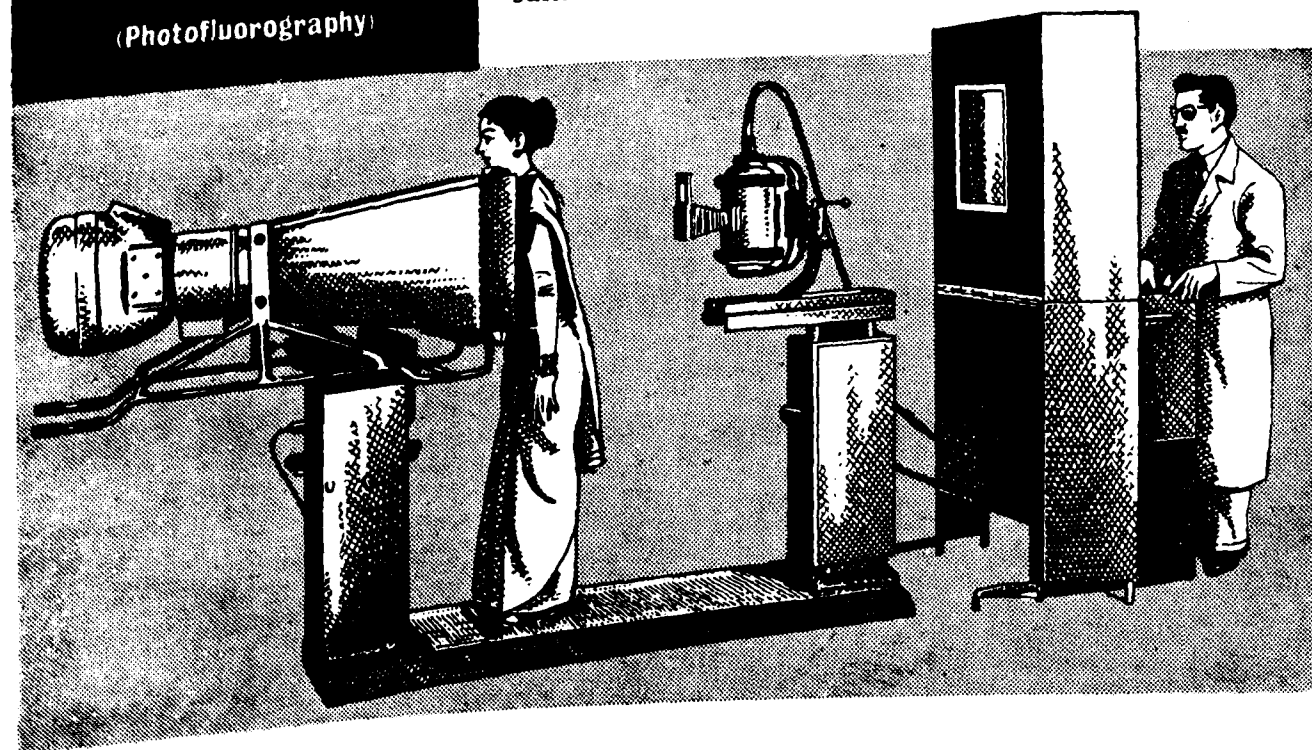
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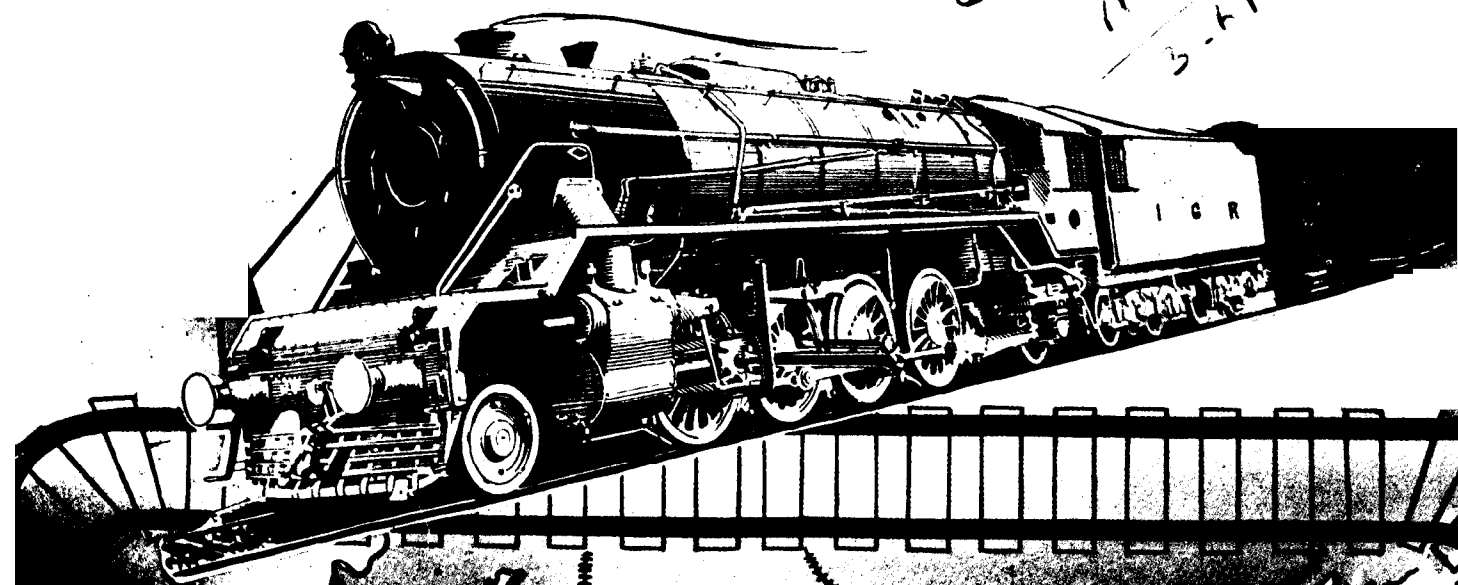
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N. F. Railway to eliminate Traffic Bottlenecks

By Rattan Lall

General Manager, North-east Frontier Railway

The author explains how despite initial difficulties and setbacks, the N. F. Railway has marched forward to undertake development of line capacity works and other improvements to break transport bottlenecks in the region. Reference is also made to the construction of the massive rail-cum-road Brahmaputra Bridge which will provide for speedier movement of men and material from the border state of Assam to the rest of India on its completion in 1962.

ALTHOUGH the North-east Frontier Railway is the smallest of all the Zonal Railways its problems are by no means small. Created in 1958 to tackle the special needs of the frontier region and to provide effective means of transport for men and material between Assam and the rest of the country, the Railway Zone claims five per cent of the total route mileage of the Indian Railways.

This portion of the Indian Railways has passed through various ordeals. Wear and tear of its permanent way and rolling stock was considerable during the last war. This was followed by partition which severed the rail link to Assam and a portion of West Bengal from rest of the country. Devastating floods raged in 1954 and 1955 affected the new Assam Link route, dislocating traffic for months together.

The Railway has successfully tackled the initial problems that once beset its path. With the completion of work on the Assam Link Route and opening of the Brahmaputra Bridge as well as the coming of broadgauge to Siliguri, it is hoped, that the major bottlenecks in the Railway will be eliminated.

Carved out from the bifurcated North Eastern Railway, the new Railway serves 300 tea gardens in West Bengal and 800 in Assam and constitutes their main mode of transport. Besides, it is the only outlet for petroleum and its products from the Digboi Oil Refinery.

The other principal commodities carried by the Railway are coal and timber from Assam and jute from Bihar and West Bengal. Its chief inward traffic is sugar, salt, food grains, pulses, tea garden stores and piece-goods.

ASSAM RAIL LINK

The Partition led to the formation of Assam Railway which had to begin from a scratch. The severance of rail links to Assam and West Bengal as a result of partition necessitated construction of Assam Rail links.

The alternative link was opened to goods traffic in December 1949 and passenger traffic in January 1950.

With the regrouping in April 1952 the Assam Railway became a part of the North Eastern Railway.

SET BACK AGAIN

The First Five Year Plan was mainly devoted to the task of absorbing the shock of the Partition. But just when the Railway was on its way to recovery, there was a fresh setback from the devastating floods mentioned earlier.

During the successive rainy seasons also the Link Route was ravaged by floods though not as seriously as those in 1954 and 1955.

Topographical conditions of the region are peculiar to itself and constitute a challenge to the ingenuity of those responsible for maintaining the train services. For most of its length, the line passes through sub-montane region and cuts across the drainage of the country at many places where a number of turbulent rivers from the Himalayans rush into the plains in their maiden fury, sometimes with a velocity of as much as 26 to 28 ft. per second.

Due to this factor, the railway track had always been subjected to repeated breaches. But whatever



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might be the obstacles, stabilisation of this Link Route, which is the lifeline to Assam, has been a vital condition precedent to the development of its economy.

STRENGTHENING THE LINK ROUTE

To prevent recurrence of breaches, extensive work has been undertaken at an estimated cost of about Rs. 6 crores. The idea is not been to fight the rivers but to tame them. The main item of work required, therefore, is effecting improvement to about 42 bridges by providing increased waterways and deeper foundation. Guiding of some of the turbulent water courses through the bridges is another important aspect of the programme. The Bridge works involve construction of 24 spans of 150', 31 spans of 100', 34 spans of 60', 54 spans of 40' and 128 spans of 20' and less. Thirty two of these bridges are on well foundation.

IMPROVEMENT IN WAGON MOVEMENT

The strengthening of the Assam Link Route is almost complete except girdering of a few bridges. The frequent interruption and continual trouble to communications on the Link Route would, it is hoped, soon become a thing of the past.

BETTER WAGON MOVEMENT

There has been considerable improvement in movement of traffic East of Siliguri Jn. The daily average movement progressively increased from 132 wagons in 1955 to 257 in 1960.

Rated against 1955 performance as 100, the performance during 1956 to 1960 has been respectively 112 (1956), 133 (1957), 150 (1958) 169 (1959) and 195 (1960). During January and February 1961, the daily average has been 291 wagons or 120.5 per cent of the figure in 1955. The Railway also moved 238 and 126 coaching vehicles respectively by important specials during this period.

BRAHMAPUTRA BRIDGE

At present a passenger and wagon ferry ply between Amingaon and Pandu with a capacity of about 250 wagons a day. During high waters in the rainy season this also becomes difficult. It, therefore, constitutes a bottleneck to speedier movement of wagons and inconvenience to the travelling public. To overcome this, the construction of a combined

rail-road bridge was undertaken in October 1958. The estimated cost of the entire project is Rs. 10.79 crores. The bridge will consist of 10 spans of 403'—4½", centre to centre of piers with a shore span of 108'—11", centre to centre of piers, at each end.

Out of 11 main piers, 8 piers have already been completed and the pier superstructures are ready to receive the girders. The work on the remaining piers is expected to be completed soon. Fabricated materials for the girders have started arriving at the work site.

The project also covers remodelling of Narangi Yard (next station east of Gauhati) which will replace the yards at Amingaon and Pandu and also serve the proposed Oil Refinery at Noonmati (Gauhati) and other ancillary works. The new yard is designed to handle 300 wagons each way for the present and provision has been made for its expansion to cater for 500 wagons or more each way.

The Bridge is likely to be brought into commission by about the middle of 1962.

INCREASING LINE CAPACITY

The single line Main Line section between Katihar and Amingaon is already saturated and will not be able to handle the increased traffic expected during the Third Five Year Plan. In order to break the bottleneck, Master plans for the development of the carrying capacity of this Railway have already been drawn up and are being progressively executed.

A Metre Gauge route of 15.53 miles from Kumedpur to Mukuria (near Barsoi) was opened to goods traffic in July, 1959 and to passenger traffic in December, 1959.

A 20 mile Broad Gauge line from Khajuriaghat to Malda Town with wagon ferry between Farakka and Khajuriaghat was opened to public goods traffic in December, 1960.

Work for provision of 94 mile Broad Gauge line from Barsoi to Siliguri Junction is in progress and is likely to be completed in a short time. Conversion of the Metre Gauge Sections from Katihar to Singhabad linking Malda Town (approximately 69 miles) and from Mukuria near Barsoi to Kumedpur (15.53 miles) into Broad Gauge Line will provide for transshipment

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of Broad Gauge to Metre Gauge and Narrow Gauge and vice-versa traffic.

There will thus be a direct Broad Gauge connection between Calcutta and Siliguri with wagon ferry across the Ganga between Farakka and Khejuriaghat. This route will provide for movement of about 100 Broad Gauge wagons per day and will serve North Bengal requirements.

NEW M. G. LINES

Construction of metre gauge from Rangapara North to North Lakhimpur covering about 107 mile, running along the stretch of the country between the Brahmaputra and the Himalayan foothills has been taken in hand. The first stretch of 12 miles including the construction of the Jia Bhareli Bridge consisting of 9 spans of 200 ft. commenced in February 1960. Railway materials have started moving over it since December 1960 upto Jia Bhareli and across the Bridge from February, 1961.

Construction of a new metre gauge line from Kalalighat to Dharmnagar (10.48 miles), which will link Tripura with Assam has been sanctioned and the project is in progress.

TRACK RENEWALS AND SIGNALLING

Due to worn out rails, trains had to be run at a restricted speed and for this reason complete renewal of track for 262 miles at an estimated cost of Rs. 3 crores has been programmed. Up till now about 190 miles of track have been renewed.

Realignment between Mal and Banarhat, to reduce the gradient, has been undertaken. This and other regrading works now in progress will increase the lead capacity of the locomotives.

To increase safety and to permit higher speeds through station yards all the stations on the main line from Katihar to Tinsukia except Tinsukia, Chaparmukh, Simaluguri Junction and Sripuriagaon have already been included for interlocking in various works programmes. The interlocking work at all the stations on the Katihar-Siliguri Junction section has been completed and that between Tandu and Tinsukia is in hand.

CENTRALISED TRAFFIC CONTROL

The Ministry of Railways has decided to introduce

Centralised Traffic Control system over the 258 mile single line section between Amingaon and Siliguri, the first of its kind on the Indian Railways, at a cost of about Rs. 5 crores.

The work is expected to be completed within about two years. The line capacity will also be increased to 24 trains each way instead of 15.

It is also proposed to dieselise goods train services over the Barauni-Katihar-Amingaon section and on the Lumding-Badarpur section. The first lot of diesels is expected to be put in service about the middle of this year.

HELPING THE INDUSTRIES

The oil Refinery located at Digboi with a capacity of .43 million tons was established there in 1900, about 60 years ago. The Railway has a fleet of 720 tank-wagons for movement of this oil which goes to different parts of the country. The Oil Refinery at Gauhati is likely to go into production by December 1961 with a capacity of .75 million tons. Additional tankwagons of 38.5 tons carrying capacity have been ordered to meet the anticipated demand.

Coal is found in Margherita and Ledo areas in Assam. Coal mining process here is different from what obtains in Bengal and Bihar Coalfields. In the Assam coalfields, the coal seams are in the shape of hills and the approach to the coal bearing strata is through a horizontal tunnel, or more correctly, one which slopes almost imperceptibly upwards from the pit mouth.

On an average, about 120 coal wagons were loaded every day on this Railway during 1960—61 (upto January) as compared to 80 and 88 wagons in 1958—59 and 1959—60 respectively.

WORKSHOPS & SHEDS

Since the partition left this portion of the Railway without any workshop worth the name, provisions have been made for the setting up of carriage and wagon workshops at Bongaigaon at an estimated cost of about Rs. 5½ crores along with expansion of the capacity of the workshop at Dibrugarh at an estimate of Rs. 10 lakhs (approximately).

Further, a new Diesel Shed at Siliguri Jn. for housing 40 Metre Gauge Locos and another at New Siliguri Jn. for accommodating 25 Narrow Gauge locos

are also proposed to be constructed in the Third Plan. At Narangi a diesel shed for 40 locos has been included in the Brahmaputra Bridge Project.

MOVEMENT OF TRAFFIC

The N. F. Railway's effort to improve, expand and modernise. The system has already borne fruit. From April 1960 to January 1961—Wagon loading has been about 10 per cent more than what was done in the corresponding period of 1958-59. The movement of traffic over the Katihar-Siliguri-Alipurduar-Amingaon section showed an improvement ranging from 14 per cent to 20 per cent as compared to previous year. Marked improvement has also been noticed on the Lumding-Badarpur section to serve the Cachar district.

Other statistics of performance are as under :—

(PERIOD APRIL TO JANUARY 10 MONTHS)

	1958—59	1959—60	1960—61	Percent- age increase in 1960—61 over 1958—59
1. Daily average No. of wagons loaded	960	985	1047	9.1
2. Tons lifted (in thou- sands)	3423	4324	4105	19.9
3. Net Ton miles (in millions)	788	774	886	12.4
4. Passengers carried (in millions)	27.5	25.5	29.9	8.7
5. Passenger miles (in millions)	1100	1037	1283	16.6

AMENITIES FOR RAILWAY USERS

Since the inception of this Railway, nearly Rs. 52

lakhs have been spent towards passenger amenities which included provision of platform coverings, foot overbridges, refreshment rooms, tea stalls, waiting rooms, waiting halls at 13 stations and bath-rooms cubicles at a number of stations. Besides, 19 stations had been electrified and 6 water coolers provided at 4 stations.

Arrangements for sale of cheap food packets have been made. Departmental catering has also been introduced at Gauhati, Pandu and on the passenger ferry plying between Pandu and Amingaon.

Another important facility introduced since December last is the provision of one 3-tier sleeper coach on the Kamrup Express trains twice a week.

Twenty-one out agencies to afford more booking facilities to the mercantile community, have been opened and public address equipments have been installed at 8 stations to assist the travelling public.

A sum of Rs. 1.03 crores is proposed to be spent during the Third Plan period on passenger amenity works.

SCHOOLS FOR RAILWAYMEN'S CHILDREN

Provision of educational facilities to the children of the Railway staff is receiving close attention and is being made on a programmed basis. The Railway is running: Five English High Schools and 4 more English High Schools will be taken over by the Railway during the Third Plan. Thirty-two single teacher free primary schools have been sanctioned of which 29 are now functioning. The remaining three will be opened shortly. Besides the Railway Schools, capitation grant is given to non-Railway schools situated at some important stations. A vocational training centre has recently been started at Maligaon for imparting technical training to staff and their children.

Super-powerful Open-hearth Furnace

A super-powerfull open-hearth furnace has been laid at the giant Magnitogorsk Steel Mill. It will produce 50 per cent more steel than any of the country's biggest furnaces at present. Under the Seven-Year Plan, the Magnitogorsk Mill, built in the thirties under the first Five Year Plan, will almost double its output, increasing it to 12 million tons a year. This increase will be achieved both through enlargement of furnaces and an intensification of the production processes through the use of high-calory fuel natural gas. Scientists are now working on a plan of the comprehensive mechanization and automation of the mill's open-hearth section.

FROM STEAM TO ELECTRICITY

By H. D. Awasty
General Manager & Chief Engineer
Railway Electrification, Calcutta

Shri Awasty outlines the progress made by the Railway Electrification, Calcutta, in the execution of its Electrification Scheme on certain sections of the Indian Railways.

The main purpose of electric traction is to provide increased line capacity on the sections serving steel plants at Rourkhela, Tatanagar, Burnpur and Durgapur to carry raw materials including coal and iron ore to the plants and take away the finished products.

THE Ministry of Railways have taken a bold decision to replace steam with electric traction to the maximum extent possible within their financial and technical man-power resources.

An independent administration known as the Railway Electrification has been set up for executing the scheme on the railways.

To move the growing traffic on our trunk routes, either new lines have to be constructed or facilities provided on existing lines to quicken the movement. One way of increasing line capacity is to replace steam by electric traction.

Increase in line capacity means that on a given section more passengers and more goods can be carried than is normally possible in the existing conditions. Railways, elsewhere having large mileage under electric traction, estimate the consequent increase in their line capacity of 50 per cent. The actual increase realized depends upon a large number of local factors.

ADVANTAGES OF ELECTRIC TRACTION

Electric traction is cheaper than steam traction in running and maintenance costs. A steam locomotive requires good coal. On the other hand, a large thermal stations supplying power to electric locomotives is specially designed to use low grade coal.

An electric locomotive can draw almost an unlimited supply of energy from the overhead electric conductors while negotiating a rise, whereas a steam or diesel locomotive must wholly depend on its own limited capacity. An electric locomotive makes full use of its weight for the purpose of

developing adhesion between all its wheels and rails and therefore draws much heavier loads than a steam locomotive of a similar weight, but which cannot make use of its full weight for the purpose of developing adhesion between wheels and rails.

A steam engine has an overall thermal efficiency of 4½ per cent as against an overall efficiency of 14 per cent of an electric locomotive. In other words, coal consumption in steam traction is about three times more than that used to produce power for electric traction.

LOWER RUNNING COST

The cost of maintenance of an electric locomotive is generally about 1/3rd of the maintenance cost of steam locomotive. As regards the running costs, an electric locomotive not doing any useful work on line does not draw any electric current, but an idling steam locomotive on line cannot but use coal and lubricants.

As regards the comparative cost of operation much depends on the cost of coal in the tender and the cost of electric energy from power station. This comparison is already favourable to the use of electric energy in most parts of India. As more hydro electric plants get commissioned, the cost of energy will reduce still further.

A lot of working time in a steam locomotive is spent in coaling and watering. It takes time to get up steam while an electric locomotive can pick up speed almost immediately. All things considered, the availability of an electric locomotive may be as high as 2½ times that of a steam locomotive. While a steam locomotive may on an average earn 100

miles a day, an electric locomotive on an average will earn 250 miles.

These being some of the considerations, all progressive railways in the World are replacing steam by diesel or electric traction, depending upon the availability of oil or electric energy in their countries.

DIFFERENT TRACTION SYSTEMS

There are a number of electric traction systems some using direct current, others employing alternating current. There are various voltages and in the case of alternating current, different frequencies and either single phase or three phases.

We have 1500 V direct current, 3000 V direct current, 20,000 V. a. c. 50 or 60 cycles per second or $16\frac{2}{3}$ cycles per second frequency and 25,000 V a. c. single phase on industrial frequency of 50 cycles per second.

The last system has now been adopted as standard by a number of West European countries, the United Kingdom, U. S. S. R. and China. The Indian Railways have also standardised on this system.

The Railways have satisfied themselves about its technical soundness as well as their ability to take remedial measures in connection with its adverse effects on neighbouring telecommunication systems. The problem of harmonics and degree of unbalance due to single phase load on the 3 phase supply system was thoroughly investigated by net work analysers in U. K. and France and found to be well within the limits acceptable to power supply authorities.

HIGH VOLTAGE CURRENT

High Voltage enables conductors of small cross-section area to be used. Their own weight as well as the wind load is comparatively light. Consequently the supporting masts and their foundations are also light. An alternating current loco, weight for weight, can draw more load than a direct current loco due to its better adhesive characteristics.

The alternating current substations are simpler and less in number over a given length than in the case of direct current. The cost of power supply arrangements is, therefore, much less. As against this, high voltage needs better insulation between live conductors and structures.

Bigger clearances for structures and better insulations cost additional money. High voltage alternating current has greater adverse effect on neighbouring telecom. Circuits which have, therefore, to be immunised by screening or removal to a safe distance.

The single phase traction load, unless within certain limits, leads to unbalance between different phases of the supply system. Even with regard to the choice of frequencies, there are arguments in favour of both sides.

The German Federal Railways still consider $16\frac{2}{3}$ cycles per second frequency as satisfactory but almost all other advanced railways are adopting 50 cycles per second. The main advantage of using the standard industrial frequency of 50 cycles per second is that it completely eliminates costly converting equipment at the substations.

These and many other factors had to be taken into account by the Indian Railways before deciding upon the future standard. It was a most difficult decision but the growing consensus of opinion amongst the highest technical authorities favours 25,000 alternating current single phase 50 cycles per second system.

PROGRESS OF ELECTRIFICATION

In India, upto the end of the First Plan, electric traction on 1500 V direct current obtained on 246 route miles around Bombay and Madras, mainly to carry suburban traffic. By 1958, Howrah to Burdwan on the Eastern Railway main line together with Sheoraphuli-Tarakeswar branch with a route mileage of 88 was electrified on 3000 V direct current. This was thus the first section to be completed in the Second Plan.

In July 1958, the Planning Commission approved of electrification on the new alternating current system of about 674 route miles during the Second Plan on the Eastern and South Eastern Railways. The section approved on the Eastern Railway was Durgapur to Mughalsarai on the Grand Chord. The sections approved on the South Eastern Railway were Asansol to Sini; Kharagpur-Tatanagar-Rourkela and Dangoaposi to Rajkharswan.

The Sealdah Division of the Eastern Railway with about 200 route miles approximately was also approved for electrification but early in the Third Plan.

STEEL PLANTS

The main purpose of electric traction is to provide increased line capacity on sections serving our steel plants at Rourkela, Tatanagar, Burnpur, and Durgapur to carry raw materials, that is, coal, iron ore etc. to the plants and take away the finished products.

The setting up of two new steel plants, at Durgapur and Rourkela and the proposed increase in the output of the two existing steel plants at Burnpur and Tatanagar, has imposed an appreciable strain on the transport capacity of the Eastern and South Eastern Railways in this area.

The finished products to be transported by rail from these four plants are expected to be about 4.47 million tons per annum by the end of the Second Plan. By the end of the Third Plan period, one more steel plant would be set up at Bokaro and the anticipated traffic offering would increase to 7.39 million tons per annum.

Each ton of finished steel requires about $4\frac{1}{2}$ tons of iron ore, coal, lime stone and other materials. The resulting strain on the two Railway systems with steam traction would have been so great that electrification of the railways was the only practical and economical solution.

It has been decided that for the time being only freight trains would be hauled electrically. Later, when more locos become available, passenger trains will also be run electrically.

COORDINATION WITH OTHER AGENCIES

In this colossal task, some other Ministries are closely associated with the Railways. The Posts & Telegraphs, under the Ministry of Communications, is responsible for replacement of aerial circuits along the railway lines to be electrified. The safe working of these circuits which serve the country and not only the railways is of prime importance.

It is only after the Posts & Telegraphs Department complete the transfer of aerial circuits into screened underground cables that the overhead traction conductors can be energised.

The responsibility for supply to the railway of power at 25,000 V alternating current is that of a number of independent power supply authorities like Damodar Valley Corporation and State Electricity Boards of

Uttar Pradesh, Bihar, Bengal and Orissa Government.

The Central Water & Power Commission, under the Ministry of Irrigation & Power, coordinates the different power supply authorities. The final progress of electrification thus depends not only on the Railway Electrification and the open line railways but also on a large number of agencies outside the control of railways.

JOB WELL DONE

After about two years of study by the Railway Board Engineer an organisation for carrying out field work known as Railway Electrification was started in 1958-59.

The position of work, a little less than three years afterwards, that is, by March 31, 1961, was that the Railway Electrification had completed their work on the sections Durgapur to Nimiaghat a little beyond Gomoh on the Eastern Railway; Asansol to Sini; Bondamunda (Rourkela) to Adityapur (Tatanagar) and Dangoaposi to Rajkharswan on the South Eastern Railway.

Of these, Durgapur to Gomoh on the Eastern Railway and Dangoaposi to Rajkharswan on the South Eastern Railway are already in commercial operation.

The sections Chakradharpur to Adityapur (Tatanagar) and Sini to Asansol and Gomoh to Gaya would be energised in stages within the next three to four months. Once this is done, the steel plants at Tatanagar, Burnpur and Durgapur would be served by electrically hauled trains.

The work is not so advanced on the remaining sections Gaya to Mughalsarai on the Eastern and Tatanagar to Kharagpur on the South Eastern Railway. However most of the ancillary works are complete including yard remodellings, staff quarters, loco sheds and remote control centres.

Survey and design of overhead traction equipment and most of the layout plans of overhead traction equipment have been finalised. About 50 percent of foundations and masts have been put up. Stringing of copper conductors which is in hand, if could have been done much copper conductors much earlier but we presume it was proposed to keep this phase of work in step with power supply and replacement of aerial circuits by P. & T. cables. There are obvious difficul-

ties in leaving long lengths of copper conductors unenergised over long periods.

ELECTRIFICATION DURING THIRD PLAN

The Railways carry forward electrification of a number of lines to the Third Plan; for instance 400 track miles of Sealdah Division of the Eastern Railway, on which, as scheduled, considerable preliminary work has been done. The sections from Sealdah to Ranaghat and Dum Dum to Bongaon have been given priority.

Similarly, civil engineering works have been carried out on Madras—Villupuram Section of the Southern Railway. Igatpuri—Bhusaval section of the Central Railway has been surveyed and the question of unbalance on the supply system due to traction load on single phase is under investigation.

An entirely new section is the long Mughalsarai—Kanpur section. Here too, the Civil Engineering Survey is in hand. Coordination between Power Supply authorities and the Posts & Telegraphs Department, both at the Ministry level and Railway Administration level has been established; our requirements have been advised.

Our Chittaranjan Loco Works and the Integral Coach Factory, Madras are engaged in establishing manufacturing capacity of a.c. locos and a.c. EMUS, respectively.

Targets of completion will now be mutually decided upon but once again we shall fix for ourselves targets which will need all our capacity to attain them.

We are admittedly behind our targets of the Second Plan which were, as they should be, very high. We were out to do in three years what would have been adjudged on many foreign railways as a remarkable

feat, if accomplished in 5 years. Had these targets been attained our rate of work would have been higher than any other railway in the World including the French Railways who are pioneers in this system and who have a lead of about 10 years over us.

Our country is far less advanced industrially than others with whom we tend to compare ourselves. It takes almost a year to import vital components of our equipment.

Erection of overhead traction equipment needs track occupation. The proposed rate of progress in our targets would have needed about 8 hours of daylight blocking of lines which would have severely handicapped rail movement on our vital trunk routes.

RELIANCE ON INDIGENOUS SOURCES

Another point which should be borne in mind is that progress of electrification depends on the matching of work by many independent authorities and not by railways alone.

Perhaps a turnkey job by a foreign agency and under one Ministry may have made the targets attainable but at the cost of carriage of a few million tons of railway goods, crores of rupees and huge foreign exchange and at the cost of our growing indigenous industry supporting electrification schemes.

It may confidently be asserted that, unlike in many other projects of this nature, the indigenous manufacturers, big or small, were given full encouragement to develop themselves.

Indian manufacturers have already made d.c. electric multiple units for suburban traffic. Bhopal Heavy Electricals are busy manufacturing traction equipment. India would now soon be making its own a.c. electric locomotives and electric multiple units coaches.

METRIC SCALES FOR USE WITH DRAFTING MACHINES

The latest edition to the series of Indian Standard Specifications on Metric Scales being prepared by ISI in connection with the changeover to the metric system is IS:1482-1960 Specification for Metric Scales for Use with Drafting Machines. Other standards published in the series cover metric scales for general purposes and metric scales for architectural purposes.

The present specification covers the requirements for metric scales of 50 cm and 30 cm lengths with four ratios, namely, 1:1, 1:2.5, 1:5 and 1:20, for use with drafting machines. A 50 cm scale and a 30 cm Scale constitute a set. The specification does not cover the design and dimensions of the device meant for fixing the Scales to the drafting machines.

CENTRALISED TRAFFIC CONTROL

By H. C. Towers, M.I.E.E., M.I.R.S.E., M. Inst. T.

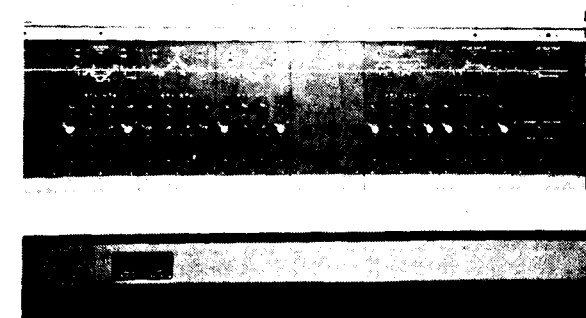
WHEN railways were first constructed telecommunications had not been developed and the crossing of opposing trains, on single lines, and the spacing of following trains, had to be regulated by time table. Good timekeeping was essential if the service was to run smoothly. If a train was delayed other trains were held up and the service was disorganised. One of the greatest difficulties facing those responsible for operation was that they had no idea which train had been delayed or where any of the trains were on the system.

The discovery of telegraphy and the development of the world famous code brought into successful service at Baltimore in 1844 by Samuel Finlay Breeze Morse introduced a great improvement in train operation. Each station was connected to a telegraph circuit and instructions regarding train crossings and other matters were transmitted from a central coordinating point. In the U.S.A. many thousands of miles of single line railway were worked on the train order or timetable method and these were soon converted to a despatcher system in which instruction to train drivers were telegraphed to fixed points along the line where they could be halted by train order signals to receive the despatcher's instructions.

Shortly after the first World War the traffic control telephone system was introduced and today it is in extensive use on British Railways, the Commonwealth and other countries. This form of communication divides a railway into traffic divisions each having a central traffic control office. Stations, signal boxes, motive power depots, railway officials, etc. are connected to it by omnibus telephone.

For operational convenience each division is separated into two or more sections, according to geographical conditions, each section being supervised by an assistant train controller. These controllers can call individual stations by selective ringing each way station, as they are termed, being allotted a ringing key or push button in the control office. Although an omnibus circuit is used, due to coding, only the

bell at the station called responds to the controllers action. Way stations attract the controller's attention by lifting up the telephone handset and announcing the name of the station or identity of the person calling. The assistant controllers are continually listening to the circuit by means of headphones. The chief train controller, who has a separate office, is provided with



Part of centralised traffic control panel.

a desk type telephone because he is only required to speak to stations on special occasions or to converse with officials out on the line. He can select the section with which he wished to converse by a selective switch.

The wayside stations report to control the arrival and departure of trains and the assistant controller records their progress on a graph. On single line sections the traffic control office issues orders regarding train crossings where delays may necessitate departure from timetable arrangements. The preparations made at stations and speed of operation of point switches and signals is entirely the responsibility of local operators and the controllers have no direct supervision of any kind. This difficulty is common to both the telephone and the train order method of control. In the U.S.A. endeavours were made to devise a system which would place the control of traffic on a section, in the hands of a single operator. This system known as Centralised Traffic Control, was invented by S. N. Wight of the General Railway

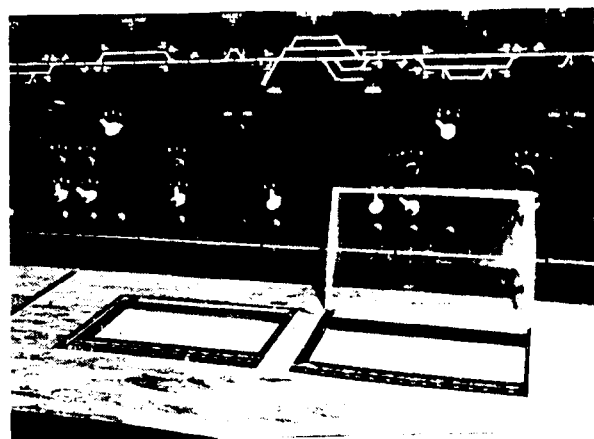
Signal Company, U.S.A. and introduced on American Railways in the early thirties.

Centralised traffic control, as it is known today, is a supervisory control system whereby all train movements are directly controlled from a central point on the section from a convenient place within it. With this system no intermediate operators are necessary because all points and signals on the section are worked from the central office. Where intermediate signals between stations are required these work automatically. The points are operated by electric switch machines though in some cases they are worked locally by the engine crew after being released from the central control office. Originally the signals were of the semaphore type, electrically operated. The arms moved in the upper quadrant and had three positions corresponding to the red, yellow and green aspects used in colour light signalling at the present time. In the U.S.A. these signals have since been replaced by colour lights. The section is track circuited throughout so that the position of all trains is known to the cTc operator and also complete protection offered to every train on the section.

The cTc operator has a control panel on which is deposited a plan of the whole section in his charge showing stations, sidings, etc. Each track circuit is shown on the panel and is fitted with a miniature electric bulb which is illuminated when the track circuit is occupied. The operator therefore has a complete picture of the whole section, can see the position of every train and note its progress. Signals and points are operated by miniature thumb switches placed on the panel under the plan and beneath the signal or points they control. The shape of the panel varies with the number of stations controlled. If there are only a few it would be flat and could be mounted on a desk or made as a floor cabinet. cTc sections may be over 100 miles in extent and in such instances it is usual for the panel to be 'U' shaped so that all switches are within the operator's reach and it is not necessary for him to leave his seat.

With a crossing station consisting of a single loop only, two switches are required at each end, the representation of it being depicted on the panel. One switch controls the points and the other the signals. The point switch has two positions, normal and reverse. Two small lamps are placed above it one having the initial 'N' and the other 'R' engraved close to it. These visuals indicate that the points are correctly set and locked, either normal or reverse, according to switch positions. The signal switch is

normally central and signals are cleared by turning it either to the left or to the right depending on whether a train is being despatched or received. Visual lights repeating the signal aspects may be provided according to an individual railway's requirements. A small red light over the signal switch would indicate that all



Section of Centralised Traffic Control panel showing stations on a single line of railway. The position of trains is shown by the miniature lamps on the tracks. The small, black switches control the points and the white switches, the signals. A train recording graph is shown on the desk.

exit and admission signals at that end of the station were showing stop. The turning of the signal switch to the left, or right, would extinguish the red visual and illuminate a green visual either at the left or right of the switch. The lighting of this visual indicated that signal is showing one of its Proceed indications (yellow or green) and also that points are correctly set and locked and opposing signals showing stop. Beneath the signal and point switches is a start button which is pressed to initiate point or signal movements.

Each station remains as a separate installation with all the interlocking securities of an individual signal box. The cTc is merely a supervisory control or "Long Arm" and even though the operator may turn a key to cause a certain signal to show "Proceed" the signal will only respond if the line over which it reads is clear, points correctly set and locked and opposing signals showing "Stop". Only two line wires are required throughout irrespective of the number of stations controlled or the number of signals, points or track circuits in use. This is achieved by a system of coding similar in principle to the traffic control telephone system.

The traffic capacity of any section of railway can be represented in train hours. When the running time of a train is known, it is a simple matter to determine the theoretical train capacity. A reduction in the running time increases the train capacity. The more trains that can be run the greater is the tonnage that can be moved. cTc makes this possible because it reduces lost time. Where trains of different speeds are involved, which is ordinarily the condition to be met, various examples of single track operation with cTc have shown that the train capacity and running time have been quite comparable with the usual operation of double track; examples of double track operation with cTc have shown an increased track capacity where one or both tracks have been signalled for either direction running and where directional congestion is an operating factor. Experience and studies show that the track capacity has been, or may be, increased from an average of 28—30 to 50—80 trains per day on single track lines. Actual operation of 42—70 trains had been accomplished on several single track lines without difficulty.

Since the introduction of cTc in the U.S.A. very considerable developments have taken place and year by year more installations have been introduced. At the present time sections of from 100 to 200 miles are controlled by cTc and even longer sections will be used in the future. There are no extensive cTc installations on British Railways at present but several trials sections are in service. Installations in Africa and New Zealand are giving very satisfactory service and cTc is being extended in these two countries and elsewhere.

In Rhodesia, the work of installing centralised traffic control began over ten years ago and the first section was in operation by September 1951. At the present time cTc installations in use are as follows:—

Gwelo (Exclusive) Heany Junction (Exclusive)

(Siemens & General Electric Railway Signal Co. Ltd.)

Gwaai (Inclusive)—Wankie (Exclusive) and Thomson Junction.

(Siemens & General Electric Railway Signal Co. Ltd.)

In 1956 A.E.I.—GRS Ltd. commenced the work of installing cTc on the section Thomson Junction—Zimba—but the work was delayed pending the introduction of new standards for station layouts and shunting movements. Work has now recommenced on this installation.

In 1957 it was decided to standardise the operating procedure at sidings and design a new basic layout. cTc was also to be extended over most of the single line sections of the Rhodesian Railways and because of the magnitude of this task it was decided to divide the work between the main signalling contractors as under:—Zimba-Ndola: (A.E.I.—GRS Ltd.), Gatooma-Gwelo: (Siemens & General Electric Railway Signal Co. Ltd.), Umtali-Gatooma: (Westinghouse Brake & Signal Co. Ltd.), The erection of line wires, cable routes, installation of axle counters, ground frames and ancillary work was to be carried out by the staff of the Signals & Communication Engineer.

Power supply is available at all stations on the section in Southern Rhodesia from Sawmills to Umtali and is obtained from the Electricity Supply Commission. Power supply failure at a station is automatically indicated on the control panel of the cTc section concerned. Diesel generators are used at those stations where a power supply is not available and these are used to charge secondary batteries. These generators are switched on and off by a control code transmitted by the control panel. An indication is provided on the panel that the generator has responded. Low voltage alarms are transmitted from all stations in the event of the battery voltage falling below a pre-determined level.

Trouble with buried cable was experienced on the original installations due to termites. On the new work taped cables are being used where it is necessary to bury them. Usually cables running at stations between location cases, signals, etc. are suspended on poles.

When centralised traffic control on the Rhodesia Railways is complete it will be the largest installation in the Commonwealth comprising some 1,200 miles of railway and ten control rooms. It can be claimed that these railways have pioneered the extensive use of centralised traffic control in Africa.

Rail Modernization Conference in London

WORLD-WIDE REPRESENTATION INCLUDES INDIA

RAILWAY officials from all over the world, including four from India, are to attend a two-day railway modernization conference in London on May 3 and 4 at which the first comprehensive account of the engineering work involved in the modernization of British Railways will be presented.

The conference has been jointly arranged by the Institution of Civil Engineers, the Institution of Mechanical Engineers, and the Institution of Electrical Engineers.

India will be represented by Mr. Karnail Singh, chairman of the Railway Board, New Delhi, and three Indian officials in London.

Other countries represented at the conference will include Australia, Belgium, Bolivia, Canada, the Federal Republic of Germany, France, Israel, Malaya, Mexico, the Netherlands, New Zealand, Pakistan, Portugal, South Africa, Spain, Sweden, Switzerland, Thailand, the United States, and the West Indies.

A spokesman for the Institution of Civil Engineers told a correspondent that the overseas representatives would be attending the conference to "find out the experiences of British engineers in planning and implementing the full-scale modernization plan. They are coming to learn about the difficulties and successes of the plan".

FIVE PAPERS

Five papers on various aspects of the scheme are to be presented by British Transport Commission engineers. They are: "The Engineering Aspects of the Modernization Plan for British Railways"; "The Impact of Mechanical Engineering on British Railways' Modernization Plan"; "British Railways' Modernization—Signal Engineering and Telecommunications"; "Electric Traction in British Railways' Modernization Plan"; and "The Contribution of Civil Engineering to British Railways' Modernization Plan". In each case, presentation of papers will be followed by discussion.

The aims of the modernization plan—published in 1954—are "to produce a thoroughly modern system able fully to meet both current traffic requirements and those of the foreseeable future" and "to exploit the great natural advantage of the railways as bulk transporters of passengers and goods and to revolutionize the character of the services provided—not only by full utilization of modern equipment, but also by purposeful concentration on those functions which the railways can be made to perform more efficiently than other forms of transport, whether by road, air, or water".

The most important single feature of the plan is replacement of steam as the predominant form of motive power by electric and Diesel traction.

* * * * *

NEW RESEARCH LABORATORY FOR BRITISH RAILWAYS PLANNED

The United Kingdom Minister of Transport, Mr. Ernest Marples, announced in London on May 10 that he had agreed to the construction of a new engineering research laboratory for British Railways.

Speaking at a luncheon of the Institution of Locomotive Engineers, he said the British Transport Commission and he were discussing plans for enlarging and improving the commission's organization for research and development and for increasing their scientific staff. He added: "We aim at getting the best scientific and technical advice for the railways, and we want an even closer relationship with the research organizations of private industries."

Mr. Marples said the Government wanted to see a railway system of the right size and shape. "They want to see it modernized and efficient; they want to see it freed from obsolete restrictions; they want it to have a high technical performance."

Mr. Marples congratulated the institution—whose aim is "advancement of the science and practice of locomotive engineering by discussion, inquiry, research, and experiment"—on the attainment of its 50th anniversary. He said it had achieved a "fine record of service."

MARODA LINK

By *Shri M. O. Chacko*

Superintending Engineer (General), Bhilai Steel Project

THE iron ore required for the Steel Plant at Bhilai is obtained from two hills, Dhalli and Rajhara, situated about 60 miles away towards the South East in the State of Madhya Pradesh. A new railway line is laid by the S.E. Railway to connect Bhilai, the nearest railway station to the Steel Plant and the hills, and the ore is now transported in special hopper type wagons over the rail.

The different shops in the Steel Plant are connected by a network of railway lines which adds up to about 60 miles and this yard is now joined to the S.E. Railway main lines, through their marshalling yard at Bhilai from the Bhilai end.

When the Plant works to its full capacity of one million tons, a quantity of 7,000 tons of iron ore per day has to be moved from the quarry on the hill side when mechanised working also will be introduced.

With a view to minimise the wagon holdings within the Plant and improve the pace of wagon turn-round, it was decided to connect the Plant from the Open Hearth end, thereby shortening the distance of travel by about 3 miles. This new connection is from Maroda station on the Bhilai—Dhali Rajhara line and covers a distance of about a mile.

This alignment runs between two water reservoirs which supply water to the Plant and Township attached to it, where the ground level is low and covered by water throughout the year.

The normal method of forming the bank from borrow pits, either by machines or manual labour, had to be abandoned due to the peculiar lay of the land and uneconomical working.

It was then decided to form the bank for the rail track with the slag and refuse from the different shops

by laying the track from the Open Hearth Yard and extending it progressively using it as a service track for transporting and dumping the material to form the bank. As the ground is under water of varying depths, progress was slow. The work was organised so that sufficient length of bank was formed each day to permit further linking of the track the following day, and provide sufficient space for dumping slag and refuse from the shops each day. The height and width of the bank formed each day was just sufficient to extend the track above the water level, when trains could be moved with safety.

The working season was limited in that the work could not be started till the water level in the area was lowest and the track had to be linked through to the opposite end before the monsoon rains commenced. This gave a working period of a month and a half commencing from the middle of May 1960 to end of June 1960. The progress of water depended directly on the quantity of slag made available from the Plant. With the co-ordinated effort of the different departments of the Plant, the track was taken through to the Maroda station by the end of June and the new connection is programmed to be used as soon as the junction arrangements are completed at Maroda station.

With the onset of the monsoon, the water level began to rise and the track had to be lifted progressively to keep it above water all the time—a special track lifting machine of USSR make was used for this and lift up to half a meter could be done at a time. The machine clamped to the rails on both sides lifts itself up along with the track, permitting the inter space being filled by manual labour. This operation is repeated over each rail length for the complete distance till the finished bank is at correct level and desired section.

[By Courtesy: The Indian Railway Engineer, Bombay]

Increasing Line Capacity on Southern Railway to meet New Traffic Demands

By F. P. Warrior

Engineer-in-Chief (Southern Railway)

The author furnishes details in regard to the various engineering works either completed or are under completion on the Southern Railway to increase line capacity. The sole objective to these efforts has been to cope with the increased traffic demands as a result of the developing economy of the country.

PROGRESS of industries and general rise in the economic level is best reflected in the demands on transportation. The demands on rail transportation in India has been heavy, indeed, necessitating various measures for increasing line capacity.

The Southern Railway has undertaken a big engineering programme which includes doubling of lines in congested sections, conversions from metre to broad gauge line, regrading lines to tackle heavier and longer trains and bridge construction works.

TRAFFIC PROBLEMS

The busiest sections on the Southern Railway are from Waltair to Madras, Madras to Jalarpet, Jalarpet to Erode and Raichur to Arkonam. Of these, the north-east line from Waltair to Madras is the main artery for the movement of traffic from north to south.

The demand for intake of wagons at Waltair has steadily been on the increase. Coupled with this the demand for loading in the Krishna and Godavari deltas have also been going up. As the intake from the Central Railway at Bezwada had also to be enlarged, large scale measures like doubling and regrading were necessary on the north-east line from Waltair to Gudur for the movement of traffic.

The Gudur-Renigunta metre gauge line had already been converted to broad gauge early in the Second Plan and as a result of this, diversion of some of the loads from Gudur to Arkonam via, Renigunta was envisaged.

This, in turn, together with the increased intake from Raichur threw a heavy burden on the section

from Renigunta to Arkonam for which purpose, doubling to the extent of 23 miles between Renigunta to Arkonam was also planned in the Second Plan.

DOUBLING OF LINES

Beyond Arkonam, with the two streams of traffic converging from Renigunta side and from Madras side, the intensity of traffic on the Arkonam-Jalarpet and on the Jalarpet-Erode section was expected to be heavy and for this purpose, doubling and regradings have been undertaken between Arkonam-Jalarpet and Jalarpet-Erode also.

The laying of a double line entails almost the same work as that of a new line especially when the present line is fully saturated with traffic and cannot be made use of for movement of construction materials for the new line.

In fact, now-a-days, with the heavy and continuous movement on the existing line, the laying of the double line with suitable connections at stations and junctions and signalling arrangements has become more complicated than that of laying a new line.

The need for careful planning is all the more apparent since not the least delay or interruption for traffic on the existing line can be allowed. Speed restrictions are also avoided to the utmost by keeping the line away where major bridges are to be constructed, so that the existing bridge foundations are not affected.

Still, in certain places, speed restrictions do become necessary, but this is kept down to the utmost.

On the Southern Railway, a total at 244 miles have been programmed for doubling during the Second Plan and of these, 144 miles were opened by 31-3-61. It is also expected that out of the balance, another 55 miles will be opened by middle of 1961. The work on the remaining sections are also on hand and in good progress.

BUILDING BRIDGE WORKS

In connection with these doublings, a total of about 1,000 new bridges have to be built, some of which are very major and difficult ones with deep well foundations, going upto 50 and 60 and below bed level, where divers have to work under water to feet the well seated on firm soil.

In view of the scarcity for steel in the early part of the Second Plan, particularly in respect of wide plates required for girders, pre-stressed concrete girder construction was adopted on a fairly large scale. They are all getting completed and the last one is expected to be opened by June, 1961. Amongst long pre-stressed concrete bridges the Bridge across Poinery river between Thiruvalem and Katpadi (length 1954') and the Bridge across Paillar river between Ulavappadu and Surareddipalayam (length 1480') deserve special mention.

BENEFITS OF CONVERSIONS

Some of the rich rice-growing areas in the Krishna delta are at present served only by the metre gauge. These sections are from Gudivada to Bhimavaram and Bezwada to Masulipatam. The growing needs of the rice traffic in this area made it necessary to improve the transportation by converting two sections into broad gauge.

In addition to improving the demands of the local traffic, this conversion will also provide an alternative route for the portion on the north-east line between Nidadavolu and Bezwada. Simultaneously with this conversion, an additional broad gauge line is also being laid between Guntur and Tadappalli so that the heavy passenger traffic between Guntur and Masulipatnam can be catered to by the broad gauge trains.

The provision of this broad gauge facility in the rich rice bowl of Andhra will be of great assistance to the people. This will also help in making the Bezwada yard more effective where already considerable improvement has been made with the provision of a hump yard for easy marshalling.

As a result of this conversion, the present metre gauge platforms will get converted into broad gauge platforms. This will provide increased reception and despatch facilities for passenger trains in the Bezwada yard.

OTHER ENGINEERING TASKS

The Gudivada-Bhimavaram conversion is expected to be completed by the middle of 1961 and Bezwada—Masulipatam by middle of 1962.

The laying of the broad gauge line from Guntur to Tadappalli together with a chord line between Tsundur and Venundla is also in progress. When these works are completed early in the Third Plan, alternative routes for the existing north east line between Nidadavolu and Tenali will be available easing considerably the traffic position.

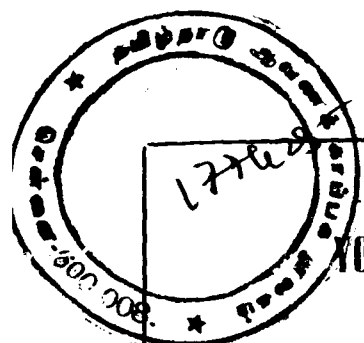
In addition to these conversions, certain lengths on the north-east line in Waltair and Rajahmundry have been regraded to remove the stiff gradients. This has enabled working of longer and heavier trains.

PROPOSALS UNDER THIRD PLAN

An intake of 600 waltair at Wagons and 500 wagons at Bezwada has been planned for the Third Plan with this end in view, remaining patches between Tenali and Gudur are being doubled and so also the patches between Arkonam and Jalarpet.

On the West Coast line too, certain difficult portions which are at present proving to be bottlenecks are being doubled.

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STANDARDIZATION IN THE FIELD OF STRUCTURES AND METALS

The fifth meeting of the Structural & Metal Division Council of the Indian Standards Institution was held on 24 March 1961 in Manak Bhavan, under the chairmanship of Sir Jehangir Ghandy, Director-in-Charge, Tata Iron & Steel Co. Ltd. The meeting was attended by representatives drawn from the Ministries of the Government of India, State Governments, Trade Industry and other Research and Technological Institutions. Representatives from the States participated for the first time.

Welcoming the members to the meeting, Sir Jehangir mentioned that as a result of rapid industrialization programme undertaken by the Government of India through Five Year Plans, the work of the Division had assumed greater national importance, as the demand for standards in the structural and metallurgical fields had continued to increase year after year.

Highlighting the achievements of this Division during the year under review, the Chairman particularly made a mention about standardization and rationalization of Carbon and Alloy Steels which would go a long way in establishing an alloy steels production industry in India on a sound footing.

Reviewing the work accomplished under the Steel Economy Programme undertaken earlier by ISI on the recommendation of the Planning Commission, Sir Jehangir disclosed that the work done in India on the preparation of Handbooks for structural Engineers and the formulation of dimensional standards for structural sheets, plates, strips, bars and bulb-plates had been highly commended. He pointed out that the work done by ISI in the field of welding had gone a long way in popularizing welding in this country. The unit set up at the Government Test House for testing and certifying welders would greatly assist the Indian Industry to get trained welders for their work.

Concluding, the Chairman mentioned that broad agreement had been reached the steel products manufactured by major steel producers in this country would be covered under the ISI Certification Mark wherever Indian Standards exist. This, he added, was an effective step forward to the popularization of ISI Certification Mark and the recognition of the value of work done by ISI.

* * *

GOLDEN RULES OF CONDUCT FOR RAILWAYMEN

1. Do you plan your work daily? Get the more essential things done first and do not neglect the important ones sidetracking them to the far end of the day.
2. Do not express casually careless opinion. Never venture forth an opinion unless asked for it.
3. Remember that most of our mental worries come either from trying to fight life hard or from trying to run away from life. Do neither.
4. Learn to accept people as they are, love them, respect them, praise them, encourage them, differ with them, but above all, learn the priceless art of give and take.
5. Cry neither for the moon, nor over spilt milk.
6. Accept the things that you cannot change; have the courage to change the things that you can, and possess the wisdom to know the difference.
7. Do not drive too hard a bargain with yourself.
8. Accept life as it is—its wonders, changes, disappointments, frustrations etc., etc.

CLEANLINESS LEADS TO HEALTH AND HAPPINESS

Clean orderly habits contribute to general health and welfare and as such to happiness and prosperity; they are more important than medicines.

Cleanliness prevents disease; medicine only attempts to cure.

Cleanliness of the person, of the houses and colonies, reflects discipline in the individual and the community. Discipline is the foundation stone for progress of oneself and the country. Cleanliness is a good habit. It is also cheap.

All Railwaymen should set an example of cleanliness. This will help others and themselves.