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ABSTRACT

The development of the National Institute of Mental Health and Neuro Sciences (NIMHANS) in Bangalore, India, is chronicled over its 10-year history. The volume begins with an examination of the Institute's organization and administration, funding, staffing, teaching activities, etc. Subsequently, reports from 26 departments of NIMHANS are included, specifically: psychiatry, clinical psychology, neurology, neurosurgery, psychiatric social work, neuroanesthesia, speech/hearing and language, nursing, physical medicine and rehabilitation, neuroradiology, neurochemistry, neuropathology, microbiology, neurovirology, psychopharmacology, neurophysiology, biophysics, biostatistics, cytogenetics, central animal research facility, library and information services, publications, medical illustration and audiovisual aids, biomedical engineering section, engineering section, and Ayurvedic research. Each departmental report contains a description of manpower development activities, clinical services, recent research studies, and future plans. (JDD)

A DECADE OF NIMHANS

National Institute of Mental Health & Neuro Sciences

Objectives of NIMHANS

1. To promote the growth and development of mental health and neuro sciences.
2. Develop the Institute into an advanced service, post-graduate training and research centre.
3. Enquire into the molecular, neuro-physiological, psychological, sociological and transcendental aspects of the brain-mind behaviour axis and to evolve suitable techniques for application in day-to-day problems.
4. Provide and assist in the activities of research, evaluation, training, consultation and guidance related to mental health including biological, psychological, sociological and clinical aspects.
5. Conduct experiments and develop patterns of teaching in under-graduate education in all branches of mental health and neurological sciences by opening training centres and instituting innovative schemes.
6. Attain self-sufficiency in post-graduate education in all branches of mental health and neuro sciences in India.
7. Develop courses and curricula in all branches of mental health and neuro sciences for under-graduate and post-graduate teaching.
8. Develop community mental health models and programmes of services, demonstration, training and research in both urban and rural areas.
9. Undertake, publication of journals, research papers, leaflets and text books and augment and maintain library information services in the furtherance of the objectives of the society.
10. Collect, organise, disseminate and publish knowledge about mental health and neuro sciences.
11. Educate the public in mental health and neuro sciences.
12. Invite representatives of Governments, Universities, other organisations and outstanding scientists from India and abroad to participate in the programmes of the Institute.
13. Co-operate with rnational and national agencies engaged in mental health and neuro sciences research d training and arrange for inter-change of personnel, material and data.

A DECADE OF
NIMHANS
(1975-85)

1986

National Institute of
Mental Health & Neuro Sciences
Bangalore-560 029 INDIA

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विगाहमानोस्ति नभोन्तरालं
प्रसन्नसत्वः स्पृहणीयचन्द्रः।
प्रक्षुब्धसंसारमहाब्धिमध्ये
भ्रमत्यसौ मानसराजहंसः।
ईषद्विकासं कृतरक्तशेभं
हृत्पङ्कजं सन्निहितं तु तत्रा।
जलस्य गर्भे निहिता समस्ति
संयोगजा संयमलब्धशान्तिः॥

In the depths of the heavens the moon sails shedding splendour that is a benediction. Below, on the troubled waters of life moves the mind of man, swan-like. Near-by is the heart-lotus, passion-laden and just blossoming. Hidden in the womb of waters lies peace born of harmony, to be realised by one who has subdued passion.

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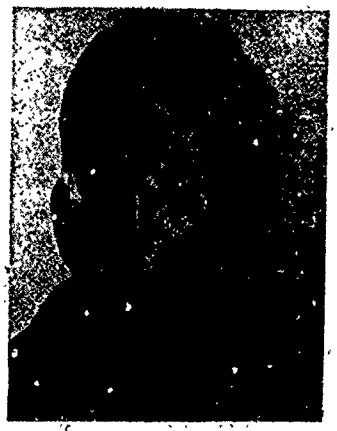

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Present

Dr. G. N. Narayana Reddy

CONTENTS

The Significance of NIMHANS

— Dr. R. M. Varma, *Professor Emeritus*

Any sensitive person, taking a look at the world we live in today, will be overwhelmed by three different feelings. There is an excitement over the phenomenal progress we have made in this world over the years. There is fear of human destructiveness and what it will do to this world. There is sorrow over the poverty that continues to grip large segments of world population today.

Advances in science have placed increasing knowledge and power in human hands without a concurrent rise in insight, wisdom and value perception. Medical sciences have been successful in continuing to eradicate diseases, but health, happiness and humanness are woefully lagging behind. While man is triumphantly brandishing his sword of external mastery, he is choking within due to a loss of inner freedom.

The reason for the above predicament is not far to seek. In the development of an individual and the society around him embedded in a large eco-system, there are three fundamental processes at work. The first is an unfolding process of the human potential in each individual which is highly specific and unique. The development of knowledge, intuition, values, skills and capabilities are of an enriching nature, lending diversity and variety in existence.

The second is a relating process — part relating to another part or whole. An autonomous part with a specificity and uniqueness relates to a heteronomous part which is distinct and different, and both relate homonomously to something larger than both. For a conscious man relating to anything or anyone else, it is important to be actively aware of this homonomy. In its absence, the relationship becomes an exploiting one — one gaining at the expense of the other. Awareness of the larger dimension makes the relationship creative, which is mutually enriching. The quality of relating significantly affects human behaviour. A happy world is one in which the relationship between man and nature, man and man, and man and God are sound.

The third process is the simultaneous and holographic perception of unity and diversity that characterise everything. At a time when knowledge is advancing in parts, discretely and with focal precisions, the experience of unity and wholeness is essential for getting the full meaning and significance of the part under consideration. If in all human endeavours the unfolding, relating and holographic processes are actively and consciously taken into account, the confronting, conflicting and competing relationships will be changed into complementing creative relationships of men, societies and nations. Destructiveness will be transformed into ennobling social action and excellence and humanness will become mutually enhancing.

It is against this background that NIMHANS, Bangalore, India should be viewed. A multidisciplinary Institute in the frontier area of Mental Health and

Neurosciences, has emerged in a multicultural country, which attained political freedom in the wake of two devastating world wars. India is poised for a bold plunge into modernity vibrant with values springing from her precious culture, wisdom and her own unique personality. She is already playing a pivotal role in the international scene to prevent confrontations and threatened annihilation of our planet. Every effort is being made towards the evolution of a world economic order of a mutually enriching kind, based primarily on the quality of human resources replacing the present transaction based, protection-ridden one which is prone to promotion of exploitation and maintenance of poverty. India has a unique opportunity to succeed in all the above efforts as she is fortunate in having all the elements within her borders to test out this remarkable and exciting model of global importance. The NIMHANS model of integration has given the most valuable insights that go far beyond the field of health into the very texture of nation building.

The following are the significant elements of the process of integration.

The Triple Event

The vision and elements of a new venture were already present from 1954. But the elements were discrete, non-coherent and hence conflict-prone. February 14, 1975, ushering in NIMHANS, witnessed the phenomenal marshalling of a number of integrative processes into a meaningful whole. The triple event that marked this historic occasion was itself significant. The first inauguration was the integrated Institute itself. The second was the inauguration of the community psychiatric unit at Sukalawara—extending a participating hand outwards into the community. The third was the inauguration of the project-consciousness—a pioneering experiment looking inwards.

Organisation

The departmental Institute of All India Institute of Mental Health of Government of India was amalgamated with the Mental Hospital of Government of Karnataka into the autonomous Institute, National Institute of Mental Health and Neuro Sciences with the participation of the Bangalore University. The combined involvement of the three organisations–Government of India, Government of Karnataka and Bangalore University in the Governing Body of the Institute, gave a quantum jump in administrative and academic freedom for growth and development, which was unavailable in any other autonomous or non-autonomous institute managed by a uni-funding agency. Not only did the centre-state difficulties instantly disappear, but the relationship turned into a mutually facilitating one which was amply proved by the Institute's growth in geometrical progression over the decade.

Community Participation

Introduction of modern technology particularly in a developing country with resource constraints, often results in the growth of isolated "Ivory Tower" institutions. The benefits of the developing competence do not reach the community nor do the community's problems reach these centres. The core of the mind of man, the core of the Institution that he makes, and the core of the community of which he is a part should be in constant communication for the overall character and quality of the endeavour. As early as 1970, a team of

psychiatrist, clinical psychologist, psychiatric social worker and psychiatric nurse, was sent to Mandya by this Institute to establish links with the community. This participating effort is now yielding invaluable fruits. NIMHANS has the unique distinction of creating the first professorial chair in community psychiatry and is among the very few institutions in the world to do so. The Institute is now taking a lead in the implementation of the national mental health policy, throughout the country. The urban-rural integration is well on its way

Consciousness

There has always been communication gaps among science, humanism and spirituality. An insight into the linkage of the above three is vital for any worthwhile activity. This is a powerful motivation for the stimulation of the grandeur and challenge of scientific temper, the ennobling perceptions and expressions of humanness and the experiential transformations of the spiritual quest characterised by a sustained commitment to emergent values. It is with this in mind that the first ever comprehensive project-consciousness was launched along with the other historic events. It is hoped that the invaluable insights of the pioneers of the East and the advancing frontiers of scientific knowledge from the pioneers of the West, together forming the main design of the project, will make available simple techniques, not only to alleviate the suffering but also to unfold the human potential for leading a better life.

Service, Training & Research

Another significant integrative process visible in the Institute, is the priority gradient established in service, training and research. At the dawn of India's Independence, a division of responsibilities came on the scene, probably as a temporary measure. The Central Government took on the responsibility of promoting teaching and research while the State Government shouldered the responsibility of service. Though this contributed a lot in the beginning towards development, the policy gradually produced grotesque distortions and anomalies in the approach of the professional to the sick. When research assumes primacy the patient becomes an appendage. When this deteriorates further, the former becomes a vehicle for self-glorification and the latter becomes a dehumanised object. If this is to be avoided, a strong, efficient service base should be established first, in any institute of higher learning. Training programmes should be geared to this, and the research activity should stem from this. Then, the training and research will show a worthwhileness and excellence of a high order. The impact of NIMHANS on the society around, has been mainly due to the strict adherence to this pattern of integration of services, training and research, in that order.

We are passing through an era of knowledge explosion where a widening gap is evident between knowledge and wisdom on one hand, and knowledge and action on the other. The above integration will tend to close these gaps significantly reducing the wastage of men and money and increasing the quality of life. Knowledge is great, but it is auto-detonating if it excludes itself from values.

Multidisciplinary Approach

The central core of integration in this multidisciplinary postgraduate Institute, is the grouping of the subjects that come under its purview. Specialisation is a

boon. But compartmentalisation is vicious. Medical nemesis sets in when the two are combined. If this is to be avoided, every specialist should have an active general awareness.

Every symptom for which a patient comes for help, has physical, mental and social components. The specialities pertaining to the field of mental health and neuro sciences, covered by NIMHANS encompass all the three dimensions. Teams of interacting specialists participate in understanding, investigating and treating patients at the out-patient and in-patient levels, so that a holistic approach is fostered and nurtured. There is a dynamic, live participation in each case, so that the full health dimension emerges in the individual, not only relieving him of the distress, but also promoting him to be a participating member of the community. The same integrated pattern is followed in academic programming and examinations system.

In addition to the three dimensions, NIMHANS has also been providing spiritual inputs. It is significant to note that when WHO deliberated on adding spiritual dimension to the already existing definition of health (which comprises the physical, mental and social dimensions) in response to India's specific request, the first comprehensive seminar by WHO on spiritual dimension of health, was held at NIMHANS.

Faculty of Mental Health and Neuro Sciences

Frontier research needs junctional explorations between disciplines. In all the universities, compartmental regulations prevent a student from doing a doctorate under two different guides from two different disciplines. NIMHANS was able to pioneer the creation of a faculty of Mental Health and Neuro Sciences in the Bangalore University, which enables a student to obtain a doctorate degree in a frontier area. This is again, first of its kind in the history of research. Bangalore University is the only university that has this faculty.

Cultural Context

Modern health inputs, not integrated with culture will either become fragmentary or face rejection. NIMHANS, from its very inception had a Division of Sanskrit to explore the cultural foundations from ancient original texts in Sanskrit and regional languages and integrate them with several areas of mental health and neuro sciences.

Tradition and Change

It is increasingly being realised that traditional systems of health, sprung from the soil, have great contributions to make towards the health of a community. Ayurveda is one of the highly integrated systems that is in vogue. The first and the only Ayurvedic Research Unit in the field of mental health along side the modern system of medicine, was established in this Institute in 1959. With the integrated functioning of these systems in this multidisciplinary Institute, it is hoped that the true complementarity will be brought out, contributing towards the practice of holistic medicine.

Foundation in Basic Sciences

An integration is also evident among the basic science sections, diagnostic sections and clinical sections, all geared towards the multidimensional approach to man in illness and health.

Usually in animal laboratories either drug trials are conducted or new techniques of intervention are tried out. But in this Institute, special integrative elements are incorporated. Comparative sciences are brought in, to lend an evolutionary perspective. In addition to tracing and verifying the physical, physiological and chemical functions of the human system in animals, enquiries are extended to psychological and sociological functions.

The Future

Thus, NIMHANS is a child of integration, of the body, life, mind and spirit of man born to serve, to learn and to explore. A decade has already demonstrated the foundations of integral health and integral living. This is 'Nim·Hans'—your swan—a little unfolding - relating·holographic being. This model, perhaps shows the pattern for a national integration of our country with many cultures and traditions emerging on the international horizon to play a leading role to pilot the world through its present chaos and crisis.

May the 'swan' herald an abiding peace within individuals and among nations.

From the Director's Desk

The National Institute of Mental Health and Neuro Sciences (NIMHANS) was inaugurated on 14th February 1975 by the then Union Minister for Health and Family Welfare, Dr. Karan Singh. After a long effort of seven years, this was possible because of his firm conviction that the future of the Institute depended on the integration of State Mental Hospital with the All India Institute of Mental Health. In the process, a new venture of partnership between the State and Central Governments, in the management and sharing of funds was initiated for the first time in the country. A decade has passed since then. As we enter into the second decade, it seems appropriate to look back, assess the present organisational and administrative set up, define our current activities, outline the developments taking place and look tentatively at the future.

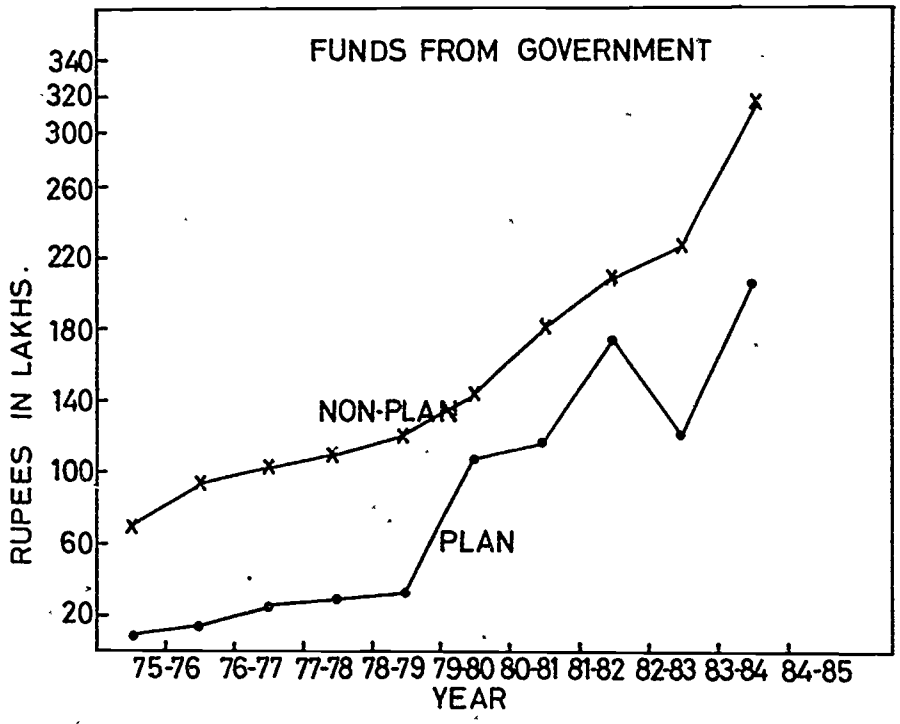
Organisation and Administration

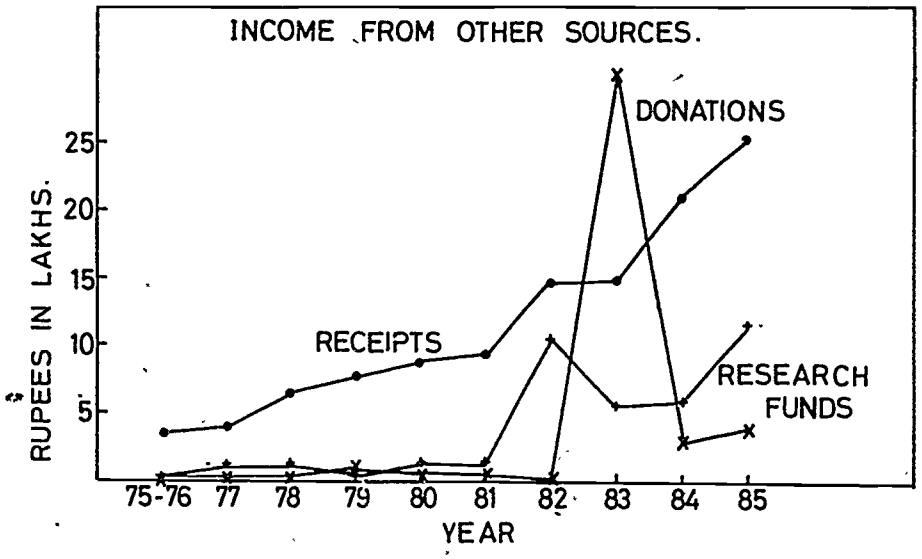
Establishment of the autonomous body, registered under the Societies Registration Act has proved definitely an advantageous and fruitful step. The functioning of the Governing Body, with the Union Minister of Health and Family Welfare as Chairman and Minister of Health and Family Welfare, Karnataka as Vice-Chairman has been effective and result-oriented. The decisions are made and implemented on the deliberations and recommendations of the statutory bodies, namely the Finance Committee, Academic Committee, Building & Works Committee and Rehabilitation Committee. The Institute has made a definite and very significant growth, with greater efficiency in the fields of service, manpower development and research activities. It is with pride and great happiness we can perceive that the dreams of founders of this Institute are being fulfilled. Almost all the objectives are on the anvil. Many have started giving results and some are initiated. The importance of mental health and neuro sciences is perceptibly felt in the country. The Institute is recognised as foremost in this field. Advanced services, training programmes and research activities are developed in the areas of biological, behavioural and basic sciences, in relation to brain-mind axis.

Funds

The Institute is funded both by the Union and Karnataka State Governments in the proportion of 75%/25% under plan and 45%/55% under non-plan respectively. The other resources are various research funding agencies like ICMR, DST, UGC, CSIR, international agencies like WHO, UNICEF, donations and internal receipts.

We are particularly grateful to the Mysore Sales International Ltd., Bangalore for their donation of Rs. 70 lakhs towards equipment and research.

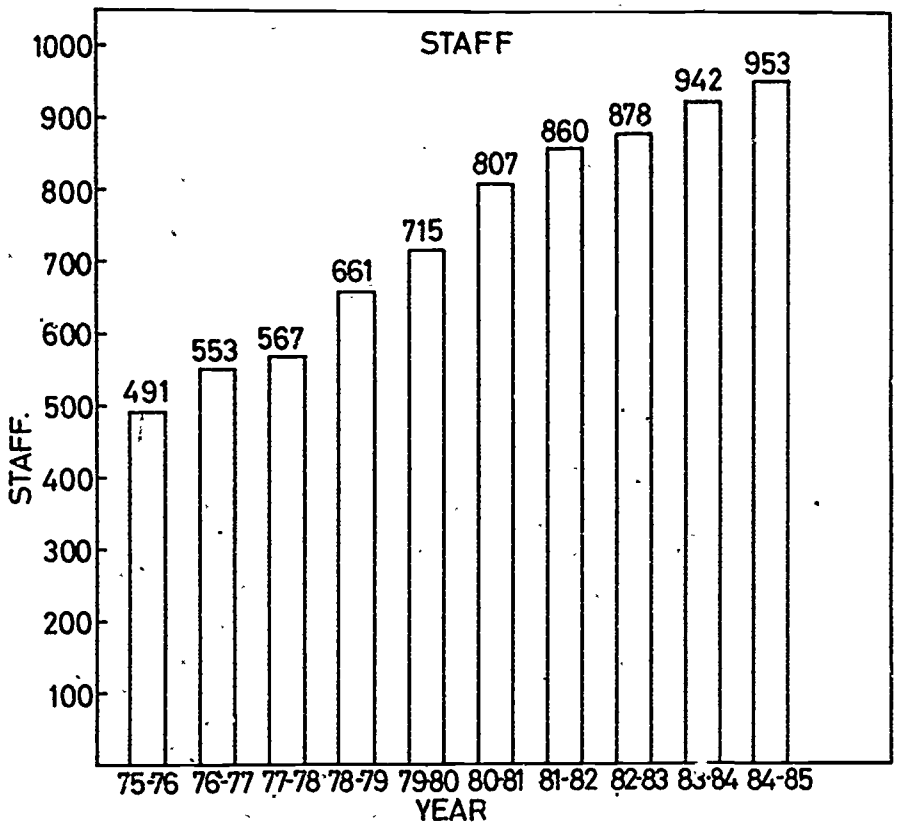




New Staff

In keeping with the needs and development of the Institute to achieve the intended objectives, active steps are taken to create and fill up a number of posts. We did find and are still finding difficult to fill up some of the posts in the field of basic sciences. The mode of recruitment has been kept flexible, although first preference is by open advertisement. The other modes of recruitment are deputation from Government or other agencies, contract appointments and

visiting professors. The growth of the staff strength is reflected in the following diagram:



Manpower Development

All efforts are made to maintain a high standard of teaching. The courses started earlier are:

1. M.D. Psychiatry
2. D.M. Neurology
3. M.Ch. Neurosurgery
4. M.Phil. Clin. Psychology
5. M.Phil. Psych. Social Work
6. D.P.M. Psychiatry
7. D.P.N.—Psych. Nursing
8. Ph.D. in Clinical Psychology.

The following new courses have been introduced:

1. M.Phil. Neurophysiology
2. Ph.D. in Neurophysiology
3. Ph.D. in M.H. & N.Sc.
4. Diploma in Neuro Nursing (DNN)

The following are the new courses approved to be started during 1986:

1. M.Phil. Biophysics
2. M.Sc. in Psychiatric Nursing.

In addition to these courses, postgraduate students from Medical Colleges and other institutions from Karnataka and other Institutions are regularly posted for training.

Development of Departments

During the decade, the existing departments are expanded with increasing number of faculty and other staff. Advanced, sophisticated and latest equipments were provided and constant updating is assured. Service facilities have been extended beyond the confines of the Institute into the rural areas. Constant and regular clinical services and training programmes are organised in rural areas. This opportunity is made use of to train the trainees to serve in the rural areas and also to develop health service research programmes to understand epidemiological problems, local needs and to evolve simple remedies. The institute is open to the public not only to get services but also to involve themselves in various activities, in particular in rehabilitation activities and creating better awareness.

The new departments added during the decade are:

1. Neurophysiology
2. Psycho-pharmacology
3. Microbiology
4. Neuro Virology
5. Cytogenetics
6. Speech, Hearing & Language
7. Rehabilitation & Physical Medicine
8. Publications
9. Mental Health Education and
10. Epidemiology (to be started)

Addition of new departments has given the expected impetus to develop the multidisciplinary research activities. Some of these departments still need to be equipped and scientists to be recruited.

Construction

Lack of space has been a constant constraint to provide better service facilities and to house laboratories. The demand for quarters for the faculty and other staff continues to exist. Efforts are made to improve the situation in all these areas. A new comprehensive out-patient block will be ready soon. This has been planned at a cost of about Rs. 135 lakhs, with all outdoor facilities and emergency services.

The wing of paediatric neurology & neurosurgery with 28 beds and additional psychiatric special wards with 70 beds are added to the inpatient services. Further the rehabilitation services are being expanded with an additional wing and inpatient bed facilities for rehabilitation of neurologically disabled. Intense efforts are put into increase the available residential quarters. At the start we had only 107 quarters for faculty. This has been increased to 137 during the decade. A new hostel for postgraduates and staff members has been added.

Being an academic and research institute, the existing library and information service facilities are found to be very inadequate. Plans are already drawn up for a new library & information service block at an approximate cost of Rs. 65 lakhs. It is also proposed to construct a ladies hostel, an auditorium in addition to new

residential facilities in a newly acquired land of about 17 acres, at Byrasandra adjacent to the campus.

Collaboration with ADAMHA, U.S.A.

The addition of basic facilities has certainly boosted up the research activities. The attitude and the outlook of the faculty has changed for the better scientific work. The series of symposia/seminars/workshops conducted regularly, has made the staff and students up-to-date The scientific temper is appreciated by leading scientists from abroad. This has resulted in an agreement between ADAMHA and NIMHANS. Under this agreement, the exchange of scientists and the dissemination of advanced scientific knowledge through seminars and publications are found to be very useful. The collaborative research projects to study the differences between the East and West are under progress, particularly in the fields of affective disorders and drug abuse and alcoholism.

Advanced Centre for Research on Community Mental Health

As a recognised of the work carried out in the field of community mental health, an advanced centre in this area is sanctioned by ICMR for five years. The main objectives of this centre are : (1) to develop and evaluate suitable models for provision of basic mental health care (2) to undertake epidemiological, phenomenological and intervention research (3) to develop and standardise instruments and tools for research purposes relevant to Indian situation.

Implementation of National Mental Health Programme

The present mental health services are catering only to about 10-15% of the suffering population of the country. Realising this, in 1975 the community mental health unit was started at NIMHANS. The Mahabodhi Society joined us in this venture, and the Sakalawara unit was started. Later this pemises of 12 acres with hospital and residential facilities was purchased from Mahabodhi

Society. Regular training programme for primary health centre doctors and health workers was started in 1982. It is in the same year the Government of India approved the National Mental Health Programme with the objectives of the foreseeable future particularly to the most vulnerable and under-privileged sector of the population. The main approach to achieve this is by integrating mental health care with primary health care. After developing models and trying this training programme in different centres, regular programme to train the health workers and the primary health centre doctors has been evolved. The regular training of PHC doctors and health workers has been undertaken since 1982 for Karnataka State. The States of Uttar Pradesh, Madhy Pradesh, Haryana, Pondicherry have been sensitized and training of trainers to implement national mental health programme has been done by involving the administrators and the appropriate individuals and plans have been worked out to implement this programme in the above States.

Linkages

The common lacunæ, in the institutions of par excellence in scientific research activities is the exposure to the field at grass root level. During the past four years, the faculty and other staff have started interacting and working in rural areas. This has helped them to understand the rural problems and to evolve different approaches in the field of health services, and to fall in line with the national policies. A good cooperation has been established between NIMHANS and Karnataka State Departments in particular, the Health & Family Welfare Department, Social Welfare Department and Education Department. Very broad based links are established between different departments of the Indian Institute of Science, Bangalore and NIMHANS. A number of scientists particularly from departments of biochemistry, molecular biology, physics, instrumentation etc. are interacting and working with the scientists of NIMHANS.

Community Participation

Success of any service facility depends on the involvement of the community. It is much more so in the field of mental and neurological sevices. Active participation of FRIENDS of NIMHANS, a voluntary organisation, in the day today programmes of the Institute, rehabilitating the discharged patients in the family and attempts in changing the attitudes of the society, is highly commendable. The industrialists, and business people are guiding and supporting us in introducing and sustaining various vocations in the rehabilitation centre. The philanthropists have come forward in constructing relatives rest house for those who come from long distances. The voluntary organisations like Rotary Clubs, Lions Clubs and local bodies have been constantly involved in organising, conducting and providing free drugs to the needy in our extension services in rural areas. The monthly extension services at Kanakapura, Maddur, Madhugiri and Gowribidanur, located at a distance of 65 kms to 120 kms from Bangalore have been serving many needy poor patients at their doorsteps.

Deemed University

The institute has grown in stature. The fullfledged, advanced service facilities should be utilised for manpower development and development of research activities relevant to Indian situation. The latest developments in the fields of

mental health and neuro sciences are most exciting. Therefore, it is not enough to simply train the post-graduates just to practice a speciality or undertake research in a specific area. They should be exposed to wide variety of advances occurring and schooled in the academic discipline of multidisciplinary approach. To achieve this, the Governing body has decided to make this Institute a Deemed University. The Government of Karnataka, the Government of India and the University Grants Commission have been approached in this regard. We hope the deemed university status will be granted very soon.

Awards

It is a pleasure to place on record that several faculty members have been conferred with awards for their distinguished contributions in their fields of specialisation.

Dr. T. Desiraju, Professor and Head, Department of Neurophysiology has been bestowed with General Bhatia Memorial Award of the Association of Physiologists and Pharmacologists of Indian in 1980; the Shanthi Swarup Bhatnagar Award of the Medical Council of India in 1980; B. C. Roy National Award of the Medical Council of India in 1982, and the Basanti Devi Amirchand Prize of the Indian Council of Medical Research in 1985.

Dr. M. Gourie Devi, Professor and Head, Department of Neurology was conferred "Lt. Col. K. N. Waghraj Memorial Gold Medal Oration" at the College of General Practitioners, Hyderabad, Andhra Pradesh in 1978; honoured as "Distinguished Scientist" at the Andhra Medical College, Visakhapatnam, Andhra Pradesh in 1982 and awarded "Dr. P. Gurumurth Memorial Oration" Commemoration Gold Medal, Indian Medical Association, Vishakapatnam, Andhra Pradesh in 1985.

Future

The important future action is to consolidate the gains achieved so far. The size of the institute should be optimum to utilise and nurture all the available strength. The excellent basic research knowledge should flow into the field for the benefit of human mankind.

G. N. NARAYANA REDDY
Director

Psychiatry

The Department of Psychiatry, one of the oldest and largest in the country, started with just two faculty members in the then All India Institute of Mental Health, is today one of the major components of NIMHANS. Its range of activity has extended beyond the walls of the hospital into the community in a variety of ways, some of which are pioneering and has occurred in the past one decade.

MANPOWER DEVELOPMENT

The Department is the largest supplier of trained psychiatrists in the country. So far, the department has produced over 300 DPMs and nearly 100 MDs in psychiatry, nearly half of this in the past one decade.

The training programme is carried out at the unit level, departmental level and also interdepartmental level. Training is also imparted to workers of other departments of the Institute, undergraduate and postgraduate trainees, other medical colleges and institutions.

One of the highlights of the decade is the introduction of screening test in the selection process for DPM and MD courses, which was introduced in 1977. In 1982, a separate screening test was introduced for those applying for MD course after DPM.

Another highlight is the introduction of systematic, supervised training in psychotherapy. The group of supervisors are in the process of evolving a model of psychotherapy, which will be easy to teach, practice and best suited to the local culture.

HOSPITAL SERVICES

The decade saw several innovative measures in the services of the hospital, viz., improvement in the living conditions of inpatients, streamlining of the outpatient services, a centralised service for modified electroconvulsive therapy, setting up of intensive care facilities for the inpatients with acute physical ailments, and the new special wards block.

The walk-in-clinic introduced in 1978 has facilitated better patient care by improving the diagnostic screening of the patient. The follow up rate has gone up by almost 300 percent in the past 10 years. The long stay patient population has decreased to less than 100, probably the lowest among the mental hospitals in the country. Some of these long stay patients live in Garden Home built by voluntary agencies inside the hospital garden thus decreasing the ill effects of the institutionalisation to a considerable extent.

The average hospital stay has decreased from 80 days to 50 days in this ten years and the certified case admissions are among the lowest in the country.

SPECIAL SERVICES

The most significant aspect of the department is its special services, pioneering in nature. Important among them are:

(i) Family Psychiatric Centre, (ii) Child and Adolescent Psychiatry Unit, (iii) Mental Retardation Clinic, (iv) Rehabilitation Unit, (v) Community Mental Health Unit and (vi) Neuro-psychiatric extension clinics at five centres.

Family Psychiatric Centre

Recognising the importance of multidimensional approach, both in understanding the etiology and management of mental

illness, family psychiatry was given due recognition as early as 1968 when temporary wards were started on an experimental basis. At the beginning the major thrust was to treat the index patient in the presence of his/her family members. Later, this lead into taking the family into the hospital for treating various problems arising out of family situation. A family Assessment Format, a family Intervention Programme, quantification of group interaction, measurement of family types are some of the notable achievements of the centre. The present permanent structure was commissioned in 1976.

Child and Adolescent Psychiatry Unit

Separate services for children and adolescents existing in the form of child guidance clinic, was established as an independent unit in 1976, offering treatment to 20 children and 10 family units as inpatients and provides out-patient services thrice a week, for new patients.

A School Mental Health Programme for sensitising teachers in early detection of mental health programme among children and intervention at their level through imparting training in counselling techniques are among the more notable achievements of the Unit.

The Unit on an average handles about 700 new cases, 2000 follow ups and admits 200 cases a year. With a systematic programme of training the personnel from various disciplines the Unit has the potential of becoming a National Centre for higher training in Child Psychiatry.

Mental Retardation Clinic

The weekly clinic offers screening facilities along with group counselling sessions to parents of retarded children. A major achievement of the clinic is the initiation of Self Help Groups, developing models of management for propagation throughout the country. Families/parents with the handicapped, of similar problems are admitted for 2-3 weeks to provide training to the parents in Self Help skills.

Community Mental Health Unit

The Unit started functioning in 1975 with the objective of knowing the prevalence rates and nature of mental disorders in the community and to design and develop models of mental health care in the community, and to develop a training programme in mental health to primary health care workers and medical officers.

A field practice area, consisting of 150 villages covering a population of 76,000 has been developed around the Rural Mental Health Centre at Sakalawara, near Bangalore.

The experience with two pilot projects of training PHC doctors and health workers, lead to the starting of a two week training programme in mental health care to primary health care personnel with the active co-operation of the Department of Health and Family Welfare, Government of Karnataka. Twelve to sixteen health workers and 5 to 6 medical officers undergo this manner of training every month. Based on this experience, the unit has organised training courses and workshops for mental health professionals and health administrators from various states in the country. A district level model to implement the National Mental Health Programme is being undertaken in Bellary district of Karnataka.

Considering the importance of the work and contributions of the unit in extending the mental health care at the primary health care level, the Indian Council of Medical Research has sanctioned an Advanced Research Centre in Community Mental Health at Sakalawara.

The unit has brought out manuals in mental health care for medical officers and health workers. The mental health professionals have been trained from the

states of AP, MP, UP, Haryana, Punjab, HP, Maharashtra, Pondicherry and Karnataka. These states have been sensitised by conducting workshops for planners and training of primary health care personnel has been undertaken in many of these states.

Mental Health Centre at K. C. General Hospital

The centre offers mainly consultation-liaison psychiatry. The centre undertook the pioneering work of training batches of urban general practitioners in mental health care. This model was successfully tested as an ICMR multicentre project.

RESEARCH

A major step in goal directed, systematic research has been the formation of research groups among faculty members. Areas for further in-depth study have been identified by the groups, importance being given to continuity in various research studies.

The areas of research in which the department is engaged are:

1. Psychiatric Epidemiology & Community Mental Health.
2. Psychiatric phenomenology
3. Pharmacological and other modes of therapy
4. Biological aspects of Psychiatry
5. Family Psychiatry
6. Child & Adolescent Psychiatry
7. Mental Retardation
8. Community Psychiatry
9. Alcoholism & Drug Dependence
10. Psychiatric Rehabilitation
11. Geriatric Psychiatry.

The Department has been involved in many intercentre collaborative research projects, funded or otherwise. The visit of ADAMHA group in 1984, 1985 and the symposia held during their visit has given further impetus to the research efforts of the department.

Among the notable research projects of the department, the ICMR collaborative study on severe mental morbidity, the evaluation of the training programme for PHC personnel, the ICMR collaborative study on training in mental health care for general medical practitioners deserve special mention.

FUTURE PLANS

In the area of phenomenology, clinical profile of various psychiatric disorders are being systematically looked into. Specific syndromes are being investigated in-depth and important psycho-pathological phenomena are being explored. An attempt is being made to study the long-term course and outcome of certain disorders.

In the therapeutic area, an ICMR study was done on the role of lithium carbonate in affective disorders including its efficacy and biochemistry. Other drugs being studied are carbamazepine in psychiatric disorders, cloridine in opiate withdrawal states, and amphetamine in negative schizophrenia.

Even the routine drug trials have taken new dimension in the launching of multicentre collaborative study of two new drugs, centibutindole in schizophrenia and Olprazolam for anxiety and depressive disorders.

Electroconvulsive therapy was investigated in a double blind, prospective, randomised study in endogenous depressives and was found to produce quicker relief compared to Imipramine. In another study ECT was shown to be superior to neuroleptics in schizophrenia.

In keeping with the general trend the world-over in biological aspects of psychiatry, the department in close collaboration with other departments of the Institute has launched several important studies like biological correlates of movement disorders, serum and CSF enzyme levels in psychotic states, biological

markers in affective and schizophrenic disorders.

Apart from standardising various family intervention strategies in psychiatric illness, particularly schizophrenia, day hospital/care evaluation, work-performance evaluation and employability of schizophrenics and mentally handicapped individuals are being carried out.

In the area of child psychiatry, an ICMR collaborative study on pattern of child and adolescent psychiatric disorders was completed. In mental retardation, large part of completed work deals with metabolite, cytogenetic studies apart from epidemiological, clinical and self help group studies.

In the area of alcoholism and drug abuse, research is focussed on biological correlates of alcoholism and alcoholic withdrawal states, incidence and prevalence studies in selected population, 4-5 year follow up of treated alcoholics and treatment outcome.

Mental health care at the doorstep

Clinical Psychology

The Department of Clinical Psychology, earlier known as the Department of Psychology and Human Relations, came into being with the founding of the erstwhile All India Institute of Mental Health in 1954. From the very beginning the aims and objectives of the department have been (i) imparting postgraduate professional training in clinical psychology; (ii) providing psychological services — diagnostic as well as therapeutic — to the public; (iii) conducting research in the field of clinical psychology & (iv) advising other agencies — Governments, Universities and Institutions — on the organisation of clinical psychological services, manpower development and research.

MANPOWER DEVELOPMENT

The department offers training in clinical psychology at two levels for scholars who have their Master's degree in psychology. The first is a two year postgraduate programme. This was earlier known as the Diploma in Medical (Clinical) Psychology (DMP) and later in 1960, it was designated as Diploma in Medical and Social Psychology (DM & SP). In 1978, this programme was redesignated as M.Phil in Medical and Social Psychology (M & SP). The changing nomenclature signifies shift in emphasis given in the training programmes as also to the continuing efforts for curriculum development with the objective of providing clinical psychologists with a training relevant to the sociocultural realities of a developing country. From the beginning there is a provision to train 12 candidates per year. Till March 1985, 267 candidates have qualified from the department.

Efforts at curriculum development have been continued. In 1979 a National Workshop supported by the WHO was held at NIMHANS to review the postgraduate training programmes in Clinical Psychology and assess their rele-vance to the national requirements. As a result, considerable changes were introduced in the training programme in 1982. These have been monitored, evaluated and on further modification and recasting, new curricula are being implemented from September 1985.

A three year doctoral degree programme in Clinical Psychology, was initiated in 1967/68. Initially there was a provision for registering two candidates every year. Since 1982, the annual intake has been increased to 4. So far 22 candidates have obtained their Ph.D degree in Clinical Psychology; 3 candidates are awaiting their results while 12 scholars are pursuing their programme.

Till the mid seventies, the department offered facilities and guidance to Ph.D. scholars in Psychology from the Arts Faculty of the Bangalore University. This practice was discontinued since the establishment of a separate psychology department in the Arts faculty. The Department offers facilities for a Ph.D. degree through the mental health & neuro sciences faculty. Through these programmes, 13 scholars have obtained their Ph.D; 2 are awaiting results and another 3 are currently engaged in their doctoral work.

Besides its major role in the training of clinical psychologists the department is engaged in providing training in psychology to psychiatrists, psychiatric social workers, psychiatric nurses and such others. Developing

programmes and curriculum for the training of these professional groups is in operation since 1982. With the introduction of extensive training in psychodiagnostics, therapeutics, and psychopathology for the MD programme in psychiatry and making it a part of the final theory examination of the MD degree a major change has been introduced in the training of psychiatrists.

Psychodiagnostics

Psychodiagnostics had been and continues to be an important area in the training programmes. In the earlier years the stress was on its contribution towards diagnosis and building of psychopathology. The current emphasis is on objective measures with emphasis on their utility as tools for research; quantification and diagnosis. As a part of clinical services the demand for psychodiagnostic services has been on the increase.

Research interest on diagnostic tools is reflected by the fact that 80 M.Phil dissertations and 20 doctoral theses have focussed their attention on utility of tools and attempted their adaptations and standardisation. The earlier focus on test construction *per se* had not been extensive. In the last three years this has been identified as a thrust area and work is in progress in developing tests of organic brain dysfunctions; a short version of security-insecurity scale measurement of self-concept; development of a scale for measuring stressful life events; coping strategies and social support systems. The development of socio-culturally relevant psychometric tools is envisaged for the next decade.

Psychosocial Aspects

The inception of the department being in the mid fifties, there had not been deep involvement in the psychoanalytical thought and intrapsychic theories. Interest had been manifest in studying interpersonal factors as well as studying psychosocial and socio-cultural factors influencing mental health and illness.

This is emphasised in the training programmes with reference to the sociocultural factors of relevance in the Indian setting.

In the initial years, one of the major areas of research work was on suicide and parasuicide. Later, work has been carried out in areas like self-perception; self-ideal discrepancy; self-esteem; self-alienation; social identity; interpersonal relationships; locus of control; social competence; congnitive distortion; empathy; personality and adjustment aspects.

Since 1982, another major area of thrust that has been identified is that of stress, coping, social-supports and adaptation within the framework of socio-technical change. Four doctoral scholars are currently working in this area. During the next decade it is planned to continue work in this area and strengthen research in understanding psychosocial factors in the promotion of health and human development.

Yet another area of interest is that of assessing the orientation and attitude towards various aspects of mental health and illness in different segments of population in the community with the aim of developing intervention strategies and launching public education programme. Two theses efforts are currently being pursued in this area.

Psychological Therapies

From the time the postgraduate training programme in clinical psychology was started, a paper on psychotherapy and counselling had been a part of the theory examination. The trainees were encouraged to take up cases for psychotherapy under supervision. This emphasis was streamlined in 1976 by making submissions of psychotherapeutic records a part of the course work. The cases taken are predominantly from the neurotic groups. The most commonly used techniques of psycho-

therapy are, supportive psychotherapy; rational emotive therapy; family therapy and marital counselling. Therapy with individuals with alcohol and drug dependence and family therapy has also been given importance.

During the next decade it is proposed to focus attention on developing models of psychotherapy which are more meaningful to the uneducated and less sophisticated population of the country. It is also intended to further fortify the supervised training in psychotherapy for postgraduates under training. The emphasis is to be on crisis intervention; supportive psychotherapy; family therapy; group therapy and rationale emotive/cognitive therapies. As an initial step in this direction, work on a doctoral thesis in this area has been started.

Behaviour Modification and Biofeedback

The department started utilising behaviour therapy as a mode of intervention since the late sixties. During the last decade and a half, the demand for behaviour therapy and biofeedback services has been steadily increasing. Mainly, clients with various types of neuroses; those with problems of alcohol/drug addiction; stress related disorders; sexual dysfunction and deviations are examined. Therapeutic services are provided to both adults and children. In the whole country, this unit happens to be the only centre which is fullfledged and active in providing services, training personnel and carrying out research. Over the last 15 years a little more than 3,000 clients have been examined and treated in the unit. The clinical records of these patients provide a rich research data bank.

To provide continuing professional education as well as to orient psychologists trained during the sixties or earlier, the department conducts continuing education programme in behaviour modification and biofeedback. The first such programme was conducted in 1977. Since 1982, this month-long intensive programme for small groups of 6—8 professional workers has become a popular and much sought after annual feature.

In addition to providing intensive training to psychology postgraduates, training is also provided to psychiatrists under training at NIMHANS as well as those coming from several other institutions.

During the initial years of the next decade, it is planned to expand behaviour therapy services by establishing separate sections for children; for those who need deaddiction; for those with sexual disorders and deviance and in particular to develop models for extending behaviour therapy services in the community. In the second phase, it is proposed to introduce behaviour therapy services to stress related disorders; mainly in the area of behavioural medicine and psychoprophylaxis.

Child Mental Health and Mental Retardation

Training in child mental health formed a part of the training of the clinical psychologists from the mid fifties. Initially the emphasis was on the assessment of intelligence and diagnosis. This has now broadened to include diagnostic assessment; building up of psychopathology as well as providing intervention by way of sensory motor training; play therapy; supportive/individual psychotherapy and behavioural counselling. Since 1980 research interest in this area has developed. One doctoral thesis has been completed while three — on hysteria, scholastic backwardness and disorders of conduct and emotion are in progress. The research interest also covers the area of developing tests and test norms for use with children in the Indian setting.

Since 1984, a therapeutic group for mothers of emotionally disturbed children has been started. Special services like the school mental health programme are also offered.

Over the next 10 years, the researach focus would be on the standardisation of developmental schedules; cognitive tests and personality tests deemed necessary for carrying out systematic research in the area of developmental disabilities and child psychopathology. It would also extend to the area of studying the phenomenology and psychopathology of non-psychotic functional disorders and scholastic backwardness. For the purpose of intervention, models are being evolved for remediation work with the scholastically backward; therapeutic intervention for children with nonpsychotic disorders and; group work and counselling with the parents of the emotionally disturbed children.

Mental Retardation

Since 1976, with the establishment of an exclusive clinic at the NIMHANS for individuals with mental handicap the department of clinical psychology has been involved in the comprehensive assessment of the mentally retarded persons; formulation of the clinical/social diagnosis; planning intervention and habilitation. Group counselling is provided for the parents of the handicapped persons. Since the beginning of 1985, 6 residential units have been kept apart for training the parents of the mentally handicapped children so that they can continue training their handicapped child at home.

With the recent announcement of the Institute about its long term policy to organise comprehensive services for all with developmental disabilities and separate it into an independent department an extensive change in orientation and working is being planned.

Neuropsychology

Neuropsychology was introduced as a speciality subject in the DM&SP programme in 1973-74. This emphasised the biological foundations of behaviour. For the purposes of patient evaluation a clinical approach was preferred to psychometric methods. Intensive efforts were made since 1976 to develop expertise in clinical neuropsychology and the expertise for a comprehensive clinical neuropsychological examination was evolved by 1978. The utility and demand for this service component becomes apparent with a look at the referral rate of patients which has increased from about 250 per year to 1,236 during 1984–85. Simultaneously, the cases being referred are no longer from the departments of neurosurgery and neurology but are also from the department of psychiatry and speciality clinics like the head-injury clinic and the spina bifida clinic.

Efforts to develop an experimental neuropsychology laboratory materialised in 1981 and since then a laboratory of international standards is in the process of being established. Much of this has taken shape and the same at present has facilities and expertise for electrophysiological recording and detailed computer analysis of signals and data. The major areas of interest are cognitive psychophysiological research in schizophrenia and frontal lobe functions. The laboratory has completed two preliminary studies on schizophrenia and currently in collaboration with the department of psychiatry, has taken up a three year follow-up study of schizophrenia. Other areas of research interest are psychological and psychophysiological deficits in head injury among adults and children and alcoholism.

Since 1983, an Information processing laboratory is also being established. The work has already commenced in the area of information processing deficits in post traumatic syndrome as well as other organic conditions involving brain pathology. A cognitive retraining programme, with emphasis on attention and memory training, developed in this laboratory is being successfully used in patients with head injury — especially those with post traumatic sequelae. During 1983-84, 12 patients were

provided with the retraining programme on a pilot and experimental basis. It is proposed to extend this as a routine service facility. A battery of information processing tests useful in the diagnosis of post-traumatic syndrome has also been developed.

This is the only centre in the country with an integrated clinical and experimental neuropsychology unit of excellence. The unit has been able to project neuropsychology as an important research area in the field of neurobiology at the national level. So far one scholar has been awarded Ph.D. in this area while two others have completed their work and submitted their theses. Three Ph.D., two MD and two M.Phil students are working in this area.

The existing research interests will be pursued in the coming years with specific object of developing early diagnostic markers; outcome predictors and indicators, and also to gain insights in psychopathology. Effects of environmental inputs, developmental problems and nutrition on neuropsychological development in individuals, as assessed by psychophysiological and information processing methods will be of major research interest of this unit. Understanding deficits and recovery of these neuropsychological functions with respect to basic functional levels already reached, in case a brain pathology develops in any of them, will be another important aspect of this research programme.

Community Psychology

The NIMHANS accepted the community mental health methodology from the mid seventies. From the very beginning the department of clinical psychology has provided routine diagnostic and therapeutic services to the urban community through the services established by the Community Mental Health unit in a general hospital setting. A school health programme was envisaged and initiated in 1976. School teachers were trained to identify children with emotional and behavioural problems and give them on the spot assistance wherever possible, or refer the children to appropriate clinical agencies.

Since 1982, in line with the philosophy of the National Mental Health Programme, the department has focussed more attention on the rural community. Preparation of mental health manuals for workers at various levels in the health delivery system; monitoring and evaluating training programmes given by the community mental health unit to find out the level of their effectiveness; enhancing public cooperation through increased awareness of problems of mental health and illness and trying out the feasibility and efficacy of behaviour modification techniques in the community have been the areas of major thrust. Since early 1985, efforts are under way to provide training for the parents of the mentally handicapped individuals so as to equip them to care for their handicapped child at home.

In addition to the increasing of manpower through adequate training programmes for peripheral health workers at all levels, the department is also interested in the formulation of training programmes in mental health delivery through non-professionals who are outside the health care set up. One such identified group has been the Anganwadi workers.

Work experience in this area has pointed out the need and provided the know-how to increase the training inputs in Community Psychology in the course curriculum of the postgraduate training programmes in clinical psychology.

Parapsychology

The work in the area of clinical parapsychology was initiated with a work carried out for one of the doctoral theses in the early seventies. So far nearly 250 individuals who claimed that they remembered their previous lives have been investigated and their claims and characteristics analysed. A preliminary enquiry into Near Death

Psychological assessment of a child

Psychological testing

Experience phenomena and claims of some others who reported paranormal abilities such as pre-cognition; pre-cognitive dreams and paranormal healing have also been taken up for study.

The work carried out since 1980 has mostly been on the basis of individual case studies. It is intended to extend the work in the coming years with greater methodological refinement and rigour.

Rehabilitation

The involvement of the department of clinical psychology, in the area of rehabilitation on a regular basis has been one of recent developments. The clinical psychology department has been engaged in the comprehensive assessment of the patient to enable his early rehabilitation in social and occupational spheres. Utilisation of the behavioural modification techniques, especially the token economy programmes, has been a major involvement. Since 1982, 72 individuals have been taken up in this programme while 32 are currently on treatment. During the seventh plan period it is planned to extend the area of work to the field of neuro-rehabilitation. The work in this area so far has a predominent clinical emphasis. It is planned to take up research studies in this regard in future.

Study of ancient Indian texts and conduct of theoretical research to find out the possibility of identifying meaningful material for understanding problems of mental health and mental illness in the Indian context has been an area of interest in the department. This has an all pervasive nature as every area of research interest of the department can be provided with relevant material from the ancient Indian texts.

The above account of the activities of the Department of Clinical Psychology has been divided into several sections for the purposes of providing a birds eye view of the activities that are ongoing in the department. To a discerning reader it would be obvious that in spite of the above categorisation there is a general communality of interest which is underlying the activities of the various groups within the department.

Group Counselling

Neurology

The Department of Neurology was established in 1955 and since then considerable progress has been made in neurology services, training and research. The coming into existence of the National Institute of Mental Health & Neuro Sciences in 1974, had a significant impact and provided momentum for accelerated growth in clinical, investigative, therapeutic and community neurology, education and training and research activities.

The structure and functions of the department were designed to realise the goals envisioned by the founders of this institute and work was carried out with inspired determination and dedication.

MANPOWER DEVELOPMENT

The Department aims to provide trained man-power for clinical and academic neurology in an attempt to fulfil the basic needs of our country which presently has less than 200 fully qualified neurologists.

Postgraduate training programme of 3 years in neurology, leading to a degree in DM was initially offered to students with MD in medicine or paediatrics. Subsequently, in keeping with national requirements and to attract outstanding students, direct entry after MBBS was introduced for a 5-year course. Intensive training in clinical neurology and allied disciplines, investigative neurology including electrodiagnosis, neuroradiology, basic sciences and research methodology, is offered. Guided and increasing clinical and practical responsibilities, case discussion, journal clubs and seminars with active participation of the student is emphasised rather than imparting knowledge by didactic lectures. Interdisciplinary approach is the central core of the training programme.

The department also provides training in neurology to postgraduate trainees of other disciplines of this institute, viz. M.Ch. Neurosurgery, DPM and MD in Psychiatry, M.Phil. and Ph.D. in Neurophysiology, Diploma in Psychiatric and Neuro-Nursing. With the increasing awareness of the importance of neurology in the training of internists and paediatricians, post-graduate students of MD in medicine and paediatrics of Medical Colleges in Karnataka and other states are regularly posted to this department for periods of 2 to 3 months. Similarly postgraduates of psychiatry of other institutes in the country are provided training in neurology.

The department has well equipped laboratories for electroencephalography, electroneuromyography, evoked potentials, polygraphy and doppler ultrasonography. Knowledge, expertise and technical skills are imparted to consultants and specialists of this country and neighbouring countries. Technicians sponsored by institutions are also given training in electrodiagnostics. The participation of faculty in several various forums of Indian Medical Association and other organisations is a regular phenomenon to disseminate the advances in the field of neurology.

SERVICES

Neurological services are offered at outpatient and in-patient levels. A systematic follow up which is essential for long term care has been achieved by the intense efforts of the medical and para-medical personnel.

Special attention is given to ensure drug compliance by proper education and dispensing drugs at the out-patient to the needy poor. In addition to general and special wards, the "Intensive respiratory unit" was established in collaboration with the department of neuroanaesthesia, for emergency treatment of neurogenic respiratory disorders. An analysis of mortality rates of Guillain-Barre syndrome, myasthenia and gravis, has shown a considerable decrease as a result of prompt and intensive ventilatory support. Patients from sister institutions in the city are often referred for expert management by the team of neurologists and neuroanaesthetists. Another important development was the establishment of paediatric neurology. There is no organised clinical service or training programme in paediatric neurology and developmental neurology in the country. Therefore there is an urgent need to foster this discipline, since children constitute a significant percentage of individuals with neurological disorders. A beginning has been made in this institute by starting a separate paediatric neurology ward. Working in close conjunction with child psychiatry a nucleus has formed and it is hoped that this branch will gain strength and grow steadily culminating as an independent discipline of "Child mental health and developmental disabilities".

Strokes form an important category of hospital admission and is one of the major causes of death. With the establishment of the Doppler ultrasonography laboratory, it has become possible to detect stenotic and occlusive lesions by a non-invasive method. By routine use, it has become possible to investigate a large number of "stroke" patients. Working in collaboration with the neurosurgical team, vascular surgery is being done. However, a significant number of patients either do not require or are not suitable for surgery, for whom intensive care has to be given in the acute stage to minimise the morbidity and mortality. Plans are underway to set up a *Stroke Unit* in collaboration with the department of neuroanaesthesia and neurosurgery, with facilities for monitoring various parameters and trial of newer methods of decreasing cerebral metabolic rate.

Despite medical and surgical management a number of individuals have residual physical disabilities preventing productive and useful life. A neurorehabilitation section has been planned with the components of physiotherapy, occupational therapy, prosthetic section and rehabilitation. This concept is currently in the process of becoming a reality.

Laboratories

Laboratories have been established to meet the demands and needs of clinical service, training and research. Electroencephalography laboratories with facilities for polygraph recording, electroneuromyography with computer facilities, evoked potentials and Doppler ultrasonography have been set up. Expertise generated in these fields has gained recognition.

It is proposed to set up soon a "neurourology" laboratory for indepth assessment of neurogenic bladder by electrophysiological techniques and urinary flow dynamic studies. The data obtained will be useful for paraplegia rehabilitation including bladder training and for corrective/prosthetic surgery or implantation of pacemakers.

RESEARCH

Sustained indepth investigations of various aspects of neurology are under progress. Most of the information has already been communicated in scientific publications and presented at National and International conferences.

1. Clinical and electroencephalographic features of epilepsy were investigated as a national "Collaborative study on Epilepsy" funded by the Indian Council

of Medical Research and PL-480 A follow-up study was continued to assess the degree of seizure control. Special activation procedures and sphenoidal EEG were standardised. A new type of reflex epilepsy—"hot water epilepsy"—predominantly seen in Karnataka has been documented. This entity had aroused considerable interest in view of the topical occurrence and the special clinical features. Studies have been initiated to assess the long-term effects of febrile convulsions in childhood and the later occurrence of epilepsy. Care-control studies have commenced to determine the risk factors for epilepsy in order to understand the reasons for the great frequency of epilepsy in rural compared to semiurban population.

2. Viral infections of central nervous system particularly "Japanese Encephalitis" has been extensively tudied in collaboration with the department of neuropathology and the National Institute of Virology, Poona. The specific clinical and pathological features have been characterised. Long-term follow-up of the survivors is under way to determine the late neuropsychiatric sequelae of this devastating disease.

   Tuberculosis of central nervous system with particular reference to improving the diagnostic accuracy and late complication of cranial and spinal arachnoiditis has been studied. Experimental work to study the evolution of process of arachnoiditis and the therapeutic response to enzyme hyaluronidase has been carried out. In the clinical setting, the therapeutic efficacy of the enzyme has been established.

   Detailed studies of other infections of central nervous system such as Salmonella typhi, fungal and parasitic infestation (neurocysticercosis) have been done. The guidelines for recognition and management have been evolved.

3. The spectrum of peripheral neuropathy with particular reference to Guillain-Barre syndrome, collagen vascular disease, leprosy and neurotoxic substances, has been a subject of sustained study. Special electrophysiological techniques have been evolved and diagnostic implications demonstrated for early detection and prognostication. Phrenic nerve conduction in Guillain-Barre syndrome has been found useful for predicting impending ventilatory failure. Ulnar dorsal cutaneous branch and greater auricular sensory conduction techniques for early detection of nerve damage in leprosy, have now found a place in the standard book on leprosy.

   Neural leprosy cell was established to integrate leprous neuropathy in the mainstream of neurology and to facilitate detailed analysis and study of nerve damage in leprosy.

4. With the setting up of the Doppler ultrasonography laboratory it has become possible to investigate a large number of "stroke" patients for detection of extracranial stenotic/occlusive lesions by a non-invasive technique. For selected patients, vascular surgery had been done with satisfactory outcome. Study of risk factors in stroke and stroke in the young is under progress.

5. An interesting condition initially termed as "South Indian paraplegia" later known as "Tropical spastic paraplegia" was described. Despite detailed investigations, aetiological basis could not be established. This remains a challenging problem.

6. A large number of individuals with Wilson's disease have been studied and the clinical features with specific

relation to bone changes, the long term course with treatment have been analysed. The high incidence of this disease in this part of the country is of interest.

7. Demyelinating disorders like multiple sclerosis have been studied in detail. The optico-spinal form was found to be the commonest type. By detailed electrophysiological studies, blink reflex and somatosensory evoked potentials, it was found that more than one third of patients of optic neuritis may have multiple sclerosis. Encephalomyeloradiculoneuropathy due to antirabic vaccination has been studied in depth and documented.

8. An interesting variant of Motor Neurone Disease "Monomelic Amyotrophy", with single limb involvement and benign course has been documented. This entity has attracted international attention.

9. Clinical features and biogenic amines have been studied in a variety of movement disorders. Various modes of therapy have been evaluated.

10. Neuroepidemiological studies are in progress. A simple method, using non-professionals and meagre resources and combining "survey" with "service" was evolved. This has been highly commended by international experts and recommended as a suitable model for developing countries with inadequate trained man-power. The spectrum of neurolcgical disorders in rural and semiurban population has been determined by a door-to-door survey. After the initial phase of "descriptive neuroepidemiology", the next phase of "analytical neuroepidemiology" is under progress. Work on analysis of risk factors responsible for higher incidence of epilepsy in rural compared to semiurban population, is in progress.

Community Neurology

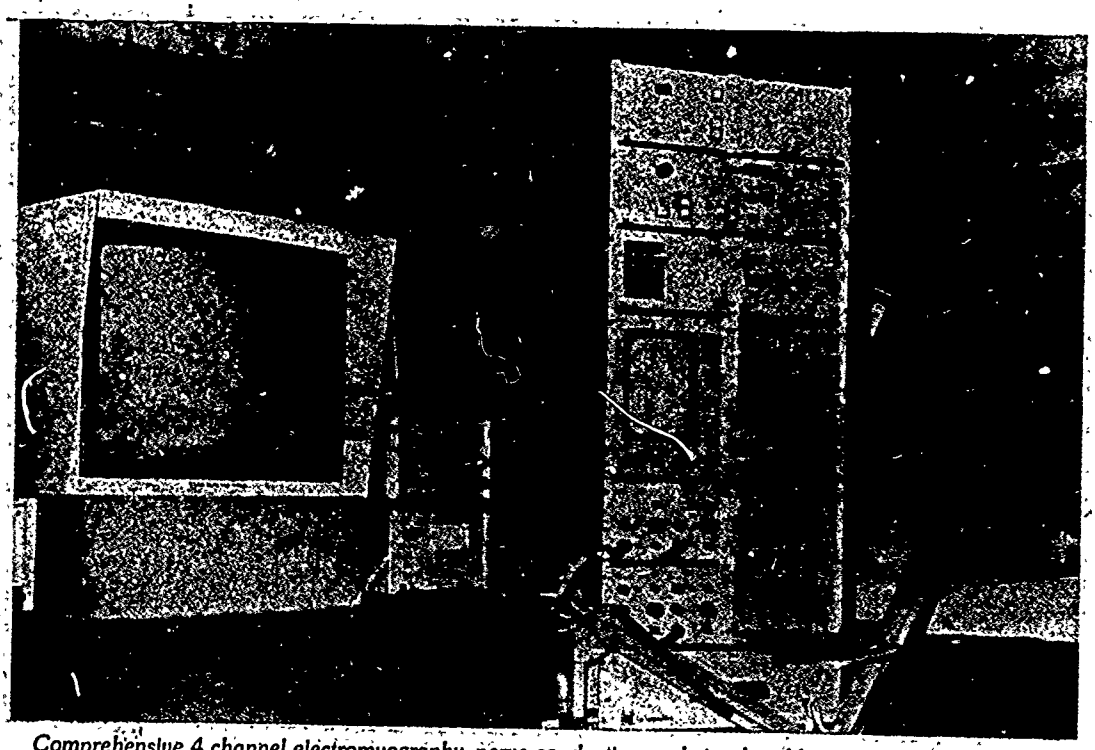
The department of neurology is actively involved in the sphere of community services. A full complement of a team of faculty and residents regularly visit the four satellite centres and offer out-patient services.

Pioneering work in neuroepidemiology at Gowribidanur, one of the satellite centres, is under progress. House-to-house survey of semiurban and rural population for determining the prevalence of neurological disorders in the community is gainfully combined with service offered at this centre. This combination has been found to be ideal in motivating individuals to disclose information about neurological disorders, including those such as epilepsy associated with social stigma.

FUTURE PLANS

An important step is to consolidate the work of various ongoing activities and promote the growth of identified areas. Establishment of stroke unit, neuroepidemiology unit and neurourology laboratory are some of the activities. The discipline of paediatric neurology has to be nurtured and integrated with child psychiatry to evolve as an independent discipline of "Child mental health and development disabilities".

Experimental neurology laboratories have to be established for training postgraduate students and for research work in problems of topical and current "worldwide" interest.



Comprehensive 4 channel electromyography, nerve conduction and visual and brainstem evoked potential system

Doppler ultrasonography—examination of carotid artery in the neck

Neurosurgery

'The Neuro Centre' was the best gift to NIMHANS on the eve of its formation in 1974. The sound conception on which the Neuro Centre was based, has provided the best atmosphere for the growth of neurosurgery during the past decade which forms the most formative period of an ongoing process of development of the speciality of neurosurgery, established in the erstwhile Mental Hospital and AIIMH, Bangalore in 1958.

MANPOWER DEVELOPMENT

Manpower generation has been one of the primary objectives of the Institute. Postgraduate training in neurosurgery commenced in 1972. The first successful student came out in 1974. The intake of number of students was increased from two to four in 1978. Till February 1985, 21 candidates have obtained M.Ch. degree in neurosurgery from this department.

Courses and demonstrations are offered to General Surgery postgraduate students during their posting to this department from different medical colleges of Karnataka. In addition to M.Ch. Neurosurgery, teaching for DM (Neurology), MD (Psychiatry) and the other nursing courses are undertaken by the faculty.

Qualified neurosurgical specialists are limited in our country. This necessitates transporting of patients with head injuries to a few specialist centres. The department has instituted training of general surgeons in government service for a period of one month in the Institute, so that they manage the head injury patients in their region promptly and efficiently. In this programme, the general surgeons in government service from Karnataka were deputed for training in the Institute. So far 43 surgeons have been trained in this programme.

SERVICES

Neurosurgery out-patient and follow up clinics are held three days a week. Neurosurgical emergency services are available round the clock. The out-patient attendance has increased from 4,500 in 1975 to 10,991 in 1984, which is more than 100% increase.

Hospital Admission

Admission to surgical service was 1,250 in 1975. For the past three years it has been around 2,200 per year, a rise of 68%. This could be possible, partly because of addition of a fourteen bedded paediatric neuro surgical ward in 1980, and more so due to quick turn over of patients It is felt that with the available number of beds, this is the maximum number of neurosurgical patients that could be adequately attended to.

Special Clinics

Spina bifida clinic. This clinic was established in 1980 to provide total care to the children with these congenital deformities. The response has been very satisfactory.

Post-trauma clinic: This clinic started in 1979, offers a comprehensive neurosurgical and psychiatric care including rehabilitation to the patients with traumatic sequelae.

EXTENSION SERVICES

As part of the Institute's multispeciality extension services in peripheral centres, members of this department attend 4 extension clinics once a month, detect and treat cases of neurosurgical disorders.

Patients requiring investigations and surgery are called to NIMHANS for admission. The clinics have proved to be of great advantage to the people of these regions, enabling easy access to specialist care and follow up.

Follow up Service

Our follow up services are worth mentioning. In 1975, 1,400 patients attended follow up clinics and in 1983-84, 5,416 patients came for follow up. It has achieved a 200% rise from the 1975 figures. The rise speaks for itself the quality of care and attention offered to the patients.

Operations

Number of operations conducted per year was between 600 and 900 till 1976. From 1977 onwards there has been a steady increase in the number of operations, to achieve a 50% rise by 1981. Since 1981, the type of operations have significantly changed, with the number of operations being around 1,400 a year. The output in surgical department depends on several factors, including availability of operating hours, number of surgeons and anaesthetists. Such high output could be possible because of availability of two operation theatres exclusively for neurosurgery, and more so due to a band of dedicated anaesthetists, residents and surgeons.

With the availability of expertise and equipments, the quality and types of operations have had significant advancement during the past decade.

Microneurosurgery

An operating microscope was obtained in 1979. The second operating microscope with colour T.V. monitoring and recording system was added in 1982.

The use of microscope in neurosurgery has been only a decade old in India. We have caught up well, and now many surgical procedures are performed with microscope. It has been possible to provide complete and safe surgery with the aid of microscope, micro-techniques and peroperative monitoring.

Microsurgery of tumour, intracranial aneurysms, cerebral and spinal vascular malformations, intramedullary tumours and intra-extracranial small vessel anastomosis are certain advanced procedures which have found place in the routine list of operations at NIMHANS.

Stereotaxic Surgery

Chemothalamotomy for parkinsonism was developed in this department some time back. A sophisticated Laitinen's stereotaxic frame was obtained in 1980. In order to facilitate the stereotaxic surgery a system of x-ray source in two directions was installed in the operation theatre. After a long period of teething troubles, now stereotaxic surgery for parkinsonism has been a routine procedure. We wish to judiciously extend this mode of treatment, to other areas of functional neurosurgery.

Monitoring Facilities

Monitoring of vital parameters, including intracranial pressure, during operation and also while on intensive care has reduced the morbidity and mortality in major intracranial operative procedures. Intra-operative evoked potential monitoring – a sophisti-

cated means of observing changes of brain and spinal cord during operation, will soon be introduced.

Advanced Surgical Aids

Use of ultrasonic aspirator and laser in neurosurgery has revolutionised the surgical treatment of many conditions which were thought to be beyond help. The department has recently acquired CUSA (Cavitron Ultrasonic Suction Aspirator) which has been put to use effectively. It is intended to procure LASER equipment shortly.

Investigation Facilities

Conventional radiological procedures and electro-diagnostic techniques were well established by 1975. From the time of formation of NIMHANS, efforts were made to acquire a C.T. Scan. It could be achieved only in 1982. Soon after, a highly sophisticated biplane angiography machine has been installed with provision for tomography and rapid serial x-ray facility. There is scope of adding a digital tomography to this machine.

Neurophysiological aids and neuropsychological means of diagnosis have provided newer dimensions to brain lesion localisation. All these developments in NIMHANS have occurred in the last five years.

RESEARCH

Research activities have slowly picked up. Though the development has been tardy, a good beginning has been made. The thrust areas are:

1. Cranio-cerebral trauma — prognostic factors and psychological impact of head injury on children.
2. Study of central canal of filum terminale in communicating hydrocephalus.
3. Study of posterior fossa cystic arachnoiditis.
4. Hydrodynamics of A.V. fistula in arterio venous malformation.
5. Visual failures in tuberculous optochiasmatic arachnoiditis.
6. Role of shunt operation in post-meningitic hydrocephalus.
7. Epidemiological study of C.N.S. malformation.
8. Experimental study on intercostal nerve and cauda equina anastomosis.
9. Study of cranio-vertebral region anomalies.

FUTURE THRUST AREAS

The department has an ambitious and comprehensive plan for its growth. The department wishes to develop the specialised areas in which development is proposed. They are:

1. Peroperative evoked potential monitoring and use of LASER and CUSA to improve surgical results and safety of surgery.
2. Rehabilitation ward — to give comprehensive care for the neurologically disabled.
3. Development of an experimental animal laboratory — to train neurosurgical trainees in microneurosurgery.

4. Research work on neural tissue transplantation and regeneration, craniocerebral trauma, craniovertebral anomalies, hydrocephalus and occlusive cerebrovascular diseases are proposed to be concentrated.

Neurosurgery in progress

Psychiatric Social Work

The first psychiatric social worker was appointed in the Bangalore Mental Hospital in 1963. In the beginning, the social work services offered to the mentally ill and their family members were confined to the wards, rehabilitation units and psychiatric out-patient departments. In fact, it was in the form of systematic social service to the patients brought to the mental hospital, admitted to the wards and to those attending follow-up programmes. In 1976 the department of Psychiatric Social Work was separated from the department of psychiatry. Since then the department has been on the march year after year.

MANPOWER DEVELOPMENT

The need for an advanced programme was felt and accordingly, the training programme for psychiatric social work was started in 1968 known as Diploma in Psychiatric Social Work. Four seats were sanctioned for this course per year, which later on increased to eight and subsequently to twelve. The DPSW programme was redesignated as M. Phil. in Psychiatric Social Work, in 1978, in keeping with emphasis needed for the profession. Research facilities leading to Ph.D. were also provided.

Since the department achieved an independent status, it has steadily progressed by adding newer programmes and greater involvement in the various activities of the NIMHANS. In fact, the Joint Conference of Indian Societies of Clinical Psychology, Psychiatry, Psychiatric Social Work and Neurology held at NIMHANS in 1979, increased the inter-disciplinary awareness among the mental health professionals in general and psychiatric social workers in particular.

The psychiatric social workers of NIMHANS have been an integral part of the multidisciplinary team. As such, in each psychiatric unit, there is at least one member from the faculty of psychiatric social work. As and when new programmes are initiated, a staff member of the department is involved with it, right from the beginning, mainly based on the interest and specialisation of the member.

In addition to the training of M. Phil. (PSW) candidates, the department is connected with training of psychiatrists, psychologists and psychiatric nurses. Similarly, they are involved with other short term training programmes offered to non-specialists and non-professionals. The members of the department cater to the needs of training the students of post-graduate social work programmes from different universities from India and abroad. They also offer expert guidance and consultation to different schools of social work and universities in regard to formulation of syllabus, training evaluation of educational and service programmes.

The training and consultation services extended by the department endows it with the recognition of being a vital link between mental health field and social work profession.

SERVICES

Psychiatric Social Work in Hospital Units

The services rendered by psychiatric social workers to the patients in the wards and the out-patient department are a meaningful mixture of indepedent therapeutic activities at individual and group levels and programmes of inter-disciplinary

nature. The activities focus on the psychosocial study of the patients and their families, formulation of social diagnosis and providing appropriate social treatment. This may be in the form of gathering information and recording the case history, making home visits and collateral contacts, explanation and education to the distressed family members, and group interaction with in-patients and out-patients. Depending on the problems, family-centred case work services are offered. In such activities, psychiatric social workers make special efforts to involve the significant person in the helping process. Mobilisation and utilisation of the resources in the family and the community for the welfare of the patients are the guiding principles of psychiatric social work services. As may be expected, each and every psychosocial situation and problem pose great challenges to the psychiatric social workers. Efforts are being made to improve the quantity and quality of such services to the out-patients and in-patients mainly through social network approach and the involvement of volunteers from social welfare agencies.

Psychiatric social work – Child Guidance Clinics – child psychiatry – have long history of intertwined links. Considering the nature of the problems and psychiatric manifestations in children, the focus on psychosocial situations is well emphasised in the multiaxial classification of childhood and adolescent disorders. Working with family members and teachers constitutes the main activity of psychiatric social work services. Therapeutic group activities with children and parents, individual discussions with siblings, interpretation of the problem to the school authorities, and liaison with child welfare agency services are the important components of social work intervention. These services are offered both at out-patient and in-patient levels. In addition to such services, he/she collaborates with psychiatrists and psychologists in organising different welfare oriented therapeutic programmes for the children and their families. Social work services in the child and adolescent unit have immense potentials for being models to their counterparts in India and other developing countries.

Psychiatric Social Worker in Family Psychiatric Centre

The psychiatric social work services focus on the marital problems and other interpersonal adjustmental difficulties in the family. These are handled at individual and family member levels. Simultaneously, all the family members admitted to the centre are guided to participate meaningfully in group sessions in order to explore the possible solutions to their problems. Such therapeutic programmes which are applicable to our socio-economic and cultural milieu are being extended to the families, mainly with the increased participation of psychiatric social workers.

Psychiatric Rehabilitation

Rehabilitation is one of the core activities of psychiatric social work. Employability, integration into the community and resocialization become important areas of service of the psychiatric social workers. The rehabilitation potentials of the patients are assessed in accordance with the 'helping potentials' of the family members, supporting nature of the relatives and friends and community resources. Problems to be encountered at each and every stage of vocational and social rehabilitation are studied individually and appropriate psychosocial solutions are offered to the patients and their families. Involvement of philanthropists, industrialists, welfare agencies and coordination of welfare services is *sine qua non* of social work programmes in the psychiatric rehabilitation unit. The professional knowledge and efforts are invested in organising rehabilitation programmes, development of psychosocial rehabilitation avenues and guidance in utilising the resources. Different attempts are made to evolve the indigenous means of rehabilitation of the mentally ill and handicapped in urban and rural settings.

Social Work Services in Community Mental Health Unit

The methods of community organisation

and social action are the main modes of delivering mental health services in rural and urban communities. Community participation and mental health education are important domains of psychiatric social work services. Social workers play an important role by participating in domiciliary care programmes, clinical services in the community and training programmes for the medical and non-medical personnel. Local leaders in mental health programmes are also involved. Similarly, involvement of students, teachers, volunteers and others interested in mental health programmes in different welfare activities has been the focus of action.

Social Work Programmes in Neurology and Neurosurgery Units

Patients with neurological illnesses, neurosurgical problems and handicaps are offered the services of psychiatric social workers in understanding the underlying psychosocial issues. This help is in the form of education to the patients and the family members, case work services to the disturbed family and providing specific rehabilitative services. Particular attention is being given to chronic disabled patients.

Families are counselled and guided in regard to their future activities and are well informed about the social security services and other resources of help. Regular home visits, agency contacts and social and vocational rehabilitative measures are undertaken in maintaining high follow-up rate in neurology and neurosurgery units.

Co-ordinating Services in Neuro-psychiatric Extension Programmes

The neuropsychiatric extension programmes being organised in Kanakapura, Maddur, Madhugiri, Gunjur and Gouribidanur coordinated by the psychiatric social worker serves as a link between the NIMHANS team and the respective community representatives. He actively participates in community meetings to discuss different aspects of organisation of monthly services, fund raising, community awareness and participation.

In addition to these monthly service programmes, psychiatric social workers participate in mental health camps, mental health exhibitions and other allied activities independently or jointly organised by NIMHANS.

RESEARCH

The research activities cover a wide range of areas.

The study on the efficacy of social work measures in the treatment of anxiety neurosis proved effective, wherein it was found that the patients retain the effects of the treatment even when the treatment was withdrawn. It was also found that social work measures in combination with psychiatric treatment showed a linear trend when they were assessed during treatment, after treatment and even after the follow-up, and patients treated only by psychiatric medicines showed good improvement while on treatment but zero improvement when medication was stopped.

The study on rearing practices and their consequences proved that unsocial type of upbringing may possibly lead to neurotic problems, anti-social upbringing may lead to personality problems; and a social upbringing may lead to severe psychiatric problems.

In the social diagnosis of neurotic conditions the observations were that neurotic patients experienced more stressful life events as compared to normal population; stress in the area of education was related with hysteria and anxiety, and bereavement with depression. Neuroticism dimension was related to neurosis as such. However, experiences of stressful events were found to be independent of personality dimension.

The study conducted on treatment of schizophrenic patients both at home and in hospital proved that:

(a) home treatment for a schizophrenic patient was economical and practical
(b) patients treated at home showed advantages in spheres of clinical improvement and social functioning ability.

(c) burden on the families of patients treated at home reduced significantly.

(d) attitude of relatives towards mental illness showed good improvement if treated at home.

Further this study also was able to bring out a improved version of a parameter on family burden.

The study on post-hospital adjustment of discharged mental patients revealed that rehabilitation of non-schizophrenics was easier compared to the schizophrenics.

The study on the family interaction of neurotics showed significant pathological conditions among the members of the family. The neuroticism dimension was also found to be independent and not related to stressful life events.

In regard to the study of long stay patients in the hospital, it was found that the stay of the patients was directly related to the three systems namely, the hospital, the patient and the family and, as such, they perpetuated the problems of long stay of the mentaly ill patients.

The study on walk-in clinic drop-outs provided the results that a long waiting list and the diagnosis of depressive neurosis were significantly associated with drop-out; and, drop-outs are associated with lack of congruence between the expectations of patient and the therapist.

The study in respect of the efficacy of multiple family group interaction proved that optimal mixture of advice, insight and support was important for a culture appropriate psychotherapy in our setting

In a study of family violence from a systemic perspective, a new classification in terms of physical violence, verbal violence, social violence, emotional violence and intellectual violence is suggested.

In a comparative study of alcohol addicts, no relapse is observed in cases treated with family therapy and group therapy when combined with medical therapy. On the other hand, relapse rate after one year was above 80% in the cases treated with behaviour therapy + group therapy, and 70% in the cases treated with medical + group therapy.

Using interactional scale it is observed that families of neurotic patients are having definite pathological interactional pattern at the level of communication, concern and leadership.

In addition to these research work, different projects connected with the neurological patients and services form the main area of research activities of psychiatric social workers. In collaboration with other departments they are involved with epidemiological studies, family intervention strategies, evaluation programmes and the like. Attempts are being made to construct research tools that are applicable to our settings. These research efforts would no doubt, strengthen the knowledge and practice base of psychiatric social work in general.

FUTURE PLANS

- To organise psychiatric social work services in different welfare agencies.
- To incorporate psychiatric social work services in labour welfare and personnel management programmes in industrial setting.
- To focus on the community efforts to organise rehabilitation agencies in their localities like half-way homes, day care centres and special schools.
- To develop the psychiatric social work services in educational institutions – schools and colleges.
- To enlist the social service support from student service organisations and other volunteers for the welfare of mentally disabled persons.
- To organise periodical inservice training programmes to the professional social workers working in the mental health centres and teachers working in teaching departments of social work.
- To develop models of training in psychiatric social work.
- To extend the field work placement for M. Phil. trainees in community agencies in addition to the present postings.

- To help/guide the schools of social work to start M. Phil/research programmes in their centres.
- To collaborate with national level welfare organisations.
- To develop further the special fields like psychiatric rehabilitation, social work with children, family, the aged, community and neurologically ill and disabled.
- To introduce regular training programmes for non-professionals from social welfare and education fields.
- To develop suitable models of psychiatric social work services in our country.
- To focus on the monitoring mechanisms in psychiatric social work services.
- To investigate in a prospective manner into the psycho-social matrix of psychiatric social work services in our country.
- To focus on the monitoring mechanisms in psychiatric social work services.
- To investigate in a prospective manner into the psycho-socio matrix in relation to genesis and development of psychological problems and management.
- To develop the department into a Centre for Advaced Studies and Research in Social Work thus making it as an apex body of psychiatric social work programmes for welfare agencies and universities.

Family counselling in session

The opening of a separate block of Neuro Centre as part of NIMHANS in 1974 has promoted a better coordination between various disciplines of neurosciences. This has been particularly true with respect to recognition and establishment of the department of neuroanaesthesia with its allied branches like neurosurgery and neuroradiology. An excellent rapport has been established between the anaesthetist, radiologist and the surgeon, so that one complimented the other in patient management.

MANPOWER DEVELOPMENT

The department has taken the responsibility of training postgraduates of anaesthesia from Bangalore University in neuroanaesthesia. The regular postgraduate candidates from Victoria Hospital, Bangalore, Bowring and Lady Curzon Hospital, Bangalore and Command Hospital, Bangalore, are posted for basic training and understanding of neuroanaesthesia for a period ranging 1-1 $^1/_2$ months. During their posting, seminars and lectures are arranged. They are taught how to use many sophisticated equipment.

SERVICES

Over the last 10 years, there has been initial phase of growth, followed by consolidation of gains. Two spacious and well equipped operation theatres were opened in the Neuro Centre which are unique in some ways. Perhaps they are the largest operation theatres in India. Secondly, radiographs can be taken from two x-ray tubes permanently fixed in position in relation to the operating table. All this has made many a complicated neurosurgical procedure possible including stereotaxy. This necessitated that anaesthetists should cope with all sorts of neurological problems. Unlike other departments, the equipments necessary for this task was not immediately available. It is noteworthy that in 1974, two Boyles Apparatus for administering anaesthesia, and a Halothane Vaporiser were the only equipments available. Monitors necessary for monitoring vital parameters of the patient were yet to be purchased. Many intra-operative changes of the vital parameters would go unnoticed. To add to the problems, no ventilators were available for post-operative ventilation when required.

Many sophisticated cardiac and other monitors were purchased for routine intra-operative monitoring. The next improvement came with the addition of a first anaesthetic ventilator in 1976. With the arrival of the ventilator, perhaps the first one in Bangalore, many long procedures could be undertaken without much strain. Controlled ventilation during the intra-operative period was resorted to more frequently. In 1978 one of the most sophisticated and best ventilators available in the world-servo ventilator – was installed. This was followed by Engstrom ventilators in early 1979. Presently this is one of the most well equipped anaesthetic departments. The various range of equipments includes multichannel telemetric monitors for ICP, arterial/venous pressure, ECG, respiration, temperature etc., oxygen analysers, blood warmers, capnographs, dopplar ultrasound infusion pumps etc.

INTENSIVE CARE UNIT

The need for intensive care of post-operative patients and also patients with neurological diseases like GB syndrome,

Advanced neuroanaesthetic equipment in use

myasthenia gravis, poliomyelitis was recognised long ago. Since 1976 attempts were made to provide assisted or controlled ventilation in post-operative period particularly for patients with CP angle tumours or other brainstem problems. However, because of shortage of ventilators and also trained personnel, it was not until November 1979 that a proper respiratory unit was opened. Incidentally again, this was the first respiratory unit to be opened in Bangalore for long term ventilation. By this time 4 bird respirators and a few other simple ventilators were purchased. To start with, nursing staff were given training to manage bed-ridden patients. With the success achieved with this 3-bedded unit, another 6-bedded recovery room for post-operative neurosurgical patients was opened in June 1984. With the addition of monitors and new, sturdy ventilators with various possible respiratory functions like PEEP, CPAP, SIMV etc., this unit is capable of dealing with all types of respiratory problems. It is however open only to patients with neurological disorders. This is perhaps one of the first centres in the country to institute routine monitoring of ICP particularly in severe head injury patients. In the beginning about 35 patients were treated. Since the last one year many severe head injury patients are being treated with intensive management, which so far was denied to this group of patients. Presently, more than 200 patients are being treated per year.

RESEARCH

Because of shortage of staff and non-availability of basic amenities research was not given adequate importance in this department for a long time. Few clinical trials were undertaken, but no publication could be produced. However, in the last decade some research activity has been undertaken and several papers have been published.

At present, the projects in progress are:

1. Comparative study of thiopentone and mannitol for intra-operative ICP reduction.
2. Use of thiopentone in the treatment of malignant cerebral oedema.

3. Aggressive management of head injury patients.
4. Role of barbiturates in cerebral protection.
5. Correlation between intra-operative vital parameter disturbance and post-operative BAEP study, in post fossa tumors.

FUTURE PLANS

The speciality of neuroanaesthesia as a super specialisation is a reality. However, there are very few anaesthetists with good training in neuroanaesthesia. Today many neurosurgical centres are being set up throughout the country. With this there will be a shortage of trained neuroanaesthetists. The department, in pursuit of its policies, is preparing to offer a one year training programme in neuroanaesthesia.

The department also has a proposal to have a fully equipped respiratory function laboratory. The intensive care wards require further improvements in service evaluated for patients with cerebro vascular strokes atlanto-axial dislocations etc., which so far could not be treated with all vigour. A modern intensive care ward with 20 beds is being proposed in the seventh five year plan.

In the last ten years, the department has grown to attain maturity and offer services, conduct research and involve in teaching programme.

Speech, Hearing and Language

With the creation of a faculty post in speech pathology under the sixth five year plan, the department of speech pathology earlier under the department of neurology with one speech therapist since 1970, was accorded the status of a full-fledged independent department on 4th August 1980. Since then a steady progress is noted in the expansion of the department, with the addition of one more faculty position and two positions of speech therapists.

Equipments

The new equipments added are Maico Dual Channel Clinical-cum-Diagnostic Audiometer, GSI 1723 Middle Ear Analyser, BA7 Bekesy Audiometer, three channelled Electronystagnography, Tracor Analytic 3000 Clinical Evoked Pctential System, B&K Calibration Equipment, Digital Sonograph etc. The following equipments were also procured during 1980-85 for therapeutic purposes: Metronome, variable speech control, speech trainer, shock therapy apparatus, noise therapy apparatus, Edinburgh speech masker, artificial larynx and other speech therapy aids like toys and books.

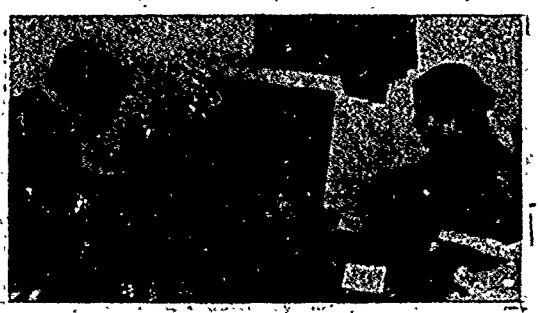
MANPOWER DEVELOPMENT

The department does not conduct any regular courses in the area of speech and hearing. However, orientation lectures and demonstration classes are held for the student trainees of (a) DM Neurology (b) M.Ch. Neurosurgery (c) DPN and DPM (d) MD Psychiatry.

Apart from the regular teaching to the above students of NIMHANS, the department has been extending its services to other institutions in training their students in the field of speech and hearing and in guiding the dissertation works.

With the increase in staff and addition of advanced diagnostic and therapeutic equipments the clinical work has recorded a sharp increase. Evaluation of speech and language has increased from 349 in 1980 to 1034 in 1984. Similarly the number of audiological tests increased from 61 to 634 and the number of patients treated increased from 392 to 776.

The department acts as a referral clinic and most patients are referred from mental retardation clinic, child guidance clinic, psychiatric and neurology and neurosurgical – OPD and in-patients. Besides, the ENT departments of St. John's Hospital, All India Institute of Speech and Hearing, refer their patients to this department for special help.



Speech therapy in progress

SERVICES

The various service activities of the department are:

(a) Providing rehabilitation clinical services to the needy speech, hearing and language disabled patients.

(b) Helping other departments in their clinical investigations by way of conducting neuro audiological, speech and language evaluations

(c) Helping other departments of NIMHANS and other institutions in their training and research by way of holding orientation lectures, clinical demonstrations, seminars and symposia.

(d) Carrying out independent research in the area of rehabilitation of speech, hearing and language disorders specifically of neuro-psychiatric origin.

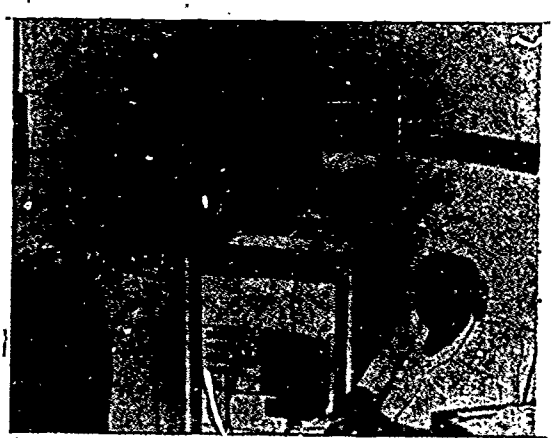
RESEARCH

The study of pattern of speech, language and hearing disorders in rural population particularly among scheduled castes and scheduled tribes was initiated in 1982-83. This 3-year project is founded by the Ministry of Health and Family Welfare, Government of India. The project is in the final stages of completion. Data on 3500 people from rural, semi-urban and urban population belonging to scheduled castes/tribes and other communities has been collected and is being analysed.

Other Projects

The staggered paired word (SPW) test in Kannada has been developed on the same line as the SPW test in English to evaluate the patients with central auditory dysfunction. Standardization of the test on normal population and its clinical efficacies are being studied.

A pilot study on the audiological evaluation of post concussion syndrome though does not show a general pattern in the auditory dysfunction, points to an abnormality at the level of brainstem. A detailed study is in progress.



Evoked potential facility—ABR under test

The Department of Nursing has recorded a gradual and steady progress in the areas of service, teaching and research activities.

MANPOWER DEVELOPMENT

The 12 months specialisation course in psychiatric nursing was changed to 11 months in 1975 and to 10 months in 1977 which brought in uniformity with other diploma courses of nursing being offered in India. This course was also under re-evaluation and modification at different times with the help of students evaluation of the course and based on suggestions given by the faculty members of nursing and other disciplines who were involved in teaching.

In 1973, the WHO consultants helped to reorganise the DPN course and the same was implemented from 1975. In 1978, the syllabus was again revised and in 1982 the Karnataka Nursing Council inspected the DPN course and in 1984 onwards DPN candidates started registering with the Karnataka Nursing Council because of its accreditation.

The 2 year M.Sc. in Psychiatric Nursing evolved by this department has been approved by the Board of Studies and Academic Council of NIMHANS, and Bangalore University, in 1984.

Psychiatric nursing in-service education programme has become a continuous activity of the department from 1974 onwards for nurses and class 'D' officials with a duration of 6 weeks. The department issues certificates after successful completion of the course. The department is on the process of preparing a psychiatric nursing manual for the in-service education course.

A short course in neurological nursing care with WHO assistance under project IND HSD 003 ward was conducted from 6 to 8 February, 1978 under Miss Karen Plager, WHO Consultant (SEARO) with 6 participants from Andhra Pradesh, Kerala and Karnataka and 6 from NIMHANS.

Nursing students of various categories like health assistants, multi-purpose health workers, general nursing, B.Sc. nursing (post basic and basic) and M.Sc. nursing students of various nursing schools of Andhra Pradesh, Tamil Nadu, Kerala, Maharashtra, Delhi, Punjab and Madhya Pradesh are being trained. Presently we are getting approximately 800 such students per year. The number of DPN and DNN students passed out from 1974 to 1984 are 201 and 2 respectively.

SERVICES

To reflect the philosophy of amalgamation and education activities the nursing faculty took up dual responsibility in clinical areas as well as in teaching. Integration of education with service raised the quality of the patient's care and improved the learning experience of DPN students under the close supervision of the nursing faculty. The role of psychiatric personnel expanded as the service specialities expanded to render sophisticated and special care to the patients.

The quality of patient care is improving slowly but steadily with increased staff strength. Now there are nurses from general nursing to B.Sc. nursing and some with DPN and DNN courses. The nature of nursing service has changed according to the trends in mental health field from seclusive care to patient government.

RESEARCH

Orientation students of M.Sc. in nursing who visit NIMHANS are guided for their pilot studies. The department is also engaged in independent research work since 1983 to find out the change in the attitude of nursing students before and after exposure to the clinical experience at NIMHANS.

Other Activities

The department actively participated in the mental health week exhibition and received prizes in 1976, 1978 and 1984. DPN students participated in the exhibition competition of Trained Nurses Association of India in December 1981, February 1983 and November 1984 and received prizes for all the exhibits displayed.

Physical Medicine and Rehabilitation

The Institute had a full fledged Rehabilitation Unit for more than a decade, as a part of the Department of Psychiatry, offering comprehensive rehabilitation services to mentally ill and mentally retarded individuals. The need for offering similar services to neurologically disabled individuals was felt a few years ago and a small Occupational Therapy Unit for this group was started about four years ago.

This experiment lead into the formation of an independent department of Physical Medicine and Rehabiiitation, offering comprehensive rehabilitation services to mentally ill, mentally retarded and neurologically disabled individuals.

The psychiatric wing of the department which deals with all mentally ill and mentally retarded individuals, offers assessment of disability, social rehabilitation including behaviour modification procedures and social skills training, occupational and recreational therapy and vocational rehabilitation as well as counselling, training and job placement.

The Centre started with 9 units consisting of Carpentry, Printing, Tailoring, Spinning and Weaving, Basket Making, Pottery, Mat Weaving Craft and Gardening, expanded its activities with the addition of a floor to the building in 1979 and subsequently added Bakery, Candle making, Leather, Blow moulding, Textile, Printing, Soap-Phenyl making, Sericulture and Packing Units.

Activities

The activities of the psychiatric wing consists of a (i) Day Care Centre/Day Hospital, which has 150 patients at any point of time, consisting of schizophrenics of subacute to chronic in nature, mental retardation of mild to severe in nature, probably the largest such Day Care Centre in the country, providing care for 6 days in a week from 8 a.m. to 5 p.m. (ii) Rehabilitation Homes for male and female long stay patients having around 50 patients in all, offering intensive psychosocial therapies with the aim of preparing them from living in the community (iii) Half Way Home for female patients, housing six patients at any time, preparing them in household chors and family life.

The Rehabilitation committee consisting of industrialists, businessmen and philanthropists is looking after this centre as a self generating programme. Voluntary organisations and individual volunteers also help the centre in resocialisation, recreation, job placement and community placements of these patients.

Goods worth Rs. 5,40,000 are produced annually. Monthly cash incentives are given to each patient on the basis of scores they get on a work performance scale and therapy is given according to the needs of individual patients.

Residents and postgraduates are offered regular training in various rehabilitation techniques. The centre has offered such training to workers of mental hospital elsewhere and to W.H.O. Fellows.

A wing for the Neurologically disabled constructed newly will house 2 wards for female and male patients, therapy rooms and will have comprehensive disability assessment, physiotherapy and occupational therapy. Apart from handling a variety of disabilities like cerebral palsy, hemiplegia, post meningitis and post traumatic

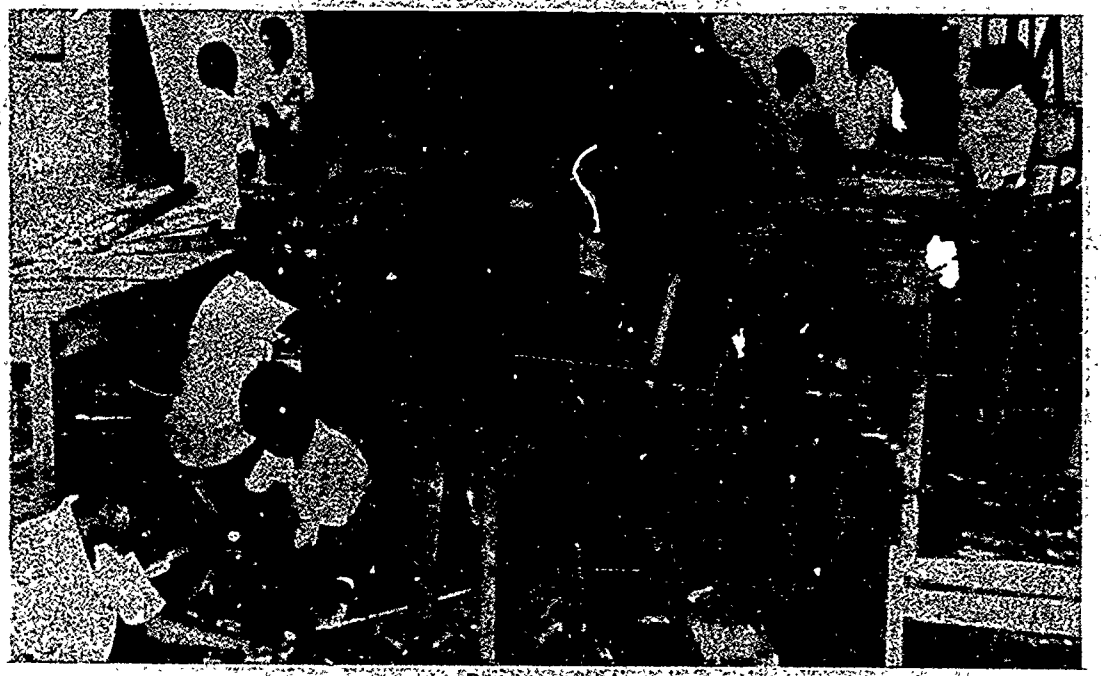
syndrome, cervical spondylitis and spinal disc lesions, the section also prepares several orthiotic devices like collars, belts, gaiters splints and crutches for this group.

RESEARCH

Among the current research activities, the more important areas are evaluation of Day Care Programme, work performance of several groups of patients and behaviour modification for chronic mentally ill group.

Future Plans

Among the future plans of the centre, apart from expanding individual vocational sections and neurological disability wing, the department has plans for more community based rehabilitation programmes than hospital based programmes.



Patients at work

Neuroradiology

For the Neuroradiology Department the last decade was a breakthrough in acquiring new equipment and also in increasing patient service. Though this department started in 1956, it had a chequered career—with no faculty at varying periods. However, since 1973 the department is functioning with regular faculty members.

MANPOWER DEVELOPMENT

Two Junior and two Senior Residents are being provided with practical training in neuroradiology. Postgraduate students from neurology, neurosurgery and psychiatry are regularly posted for training in neuroradiology. Postgraduate students in radiology from medical colleges in the state are also given training in neuroradiology.

Equipment

A 1000 mA x-ray unit with a fixed tube for a A.P. in the operation theatre at a height of 6 m and the lateral tube housed in a room adjacent to the operation theatre is an asset for radiological investigations both before and during surgery. A Klinoskop x-ray table with a new generator and a mobile x-ray machine were added in 1977 and 1978 respectively. A Cordis pressure injector and an automatic film processor for carrying out transfermoral catheter studies of the cerebral vessel were purchased in 1980 and 1981 respectively. A linear tomography table was attached to the existing Klinoskop table in 1982. In the same year a C.T. Scanner (head) was purchased. With the introduction of the C.T. Scan, a number of invasive investigative procedures like angiograms, ventriculograms, pneumoencephalogram etc., have been reduced. Precise location, size and probable pathology could be studied pre operatively. The equipment also has facilities for coronal and sagittal reconstructions.

A fibre-optic image intensifier was attached to the Klinoskop table in 1983 which facilitated a better and clearer visualization of the structures on fluoroscopy.

A biplane angiography equipment was donated by a public enterprise—Mysore Sales International Limited—in 1984. This has helped in conducting transfermoral catheter studies of the cerebral and spinal vessels, with considerable reduction of radiation to the patients and operator. Th dynamics of the blood vessels can be studied. X-rays are obtained in both the planes with a single injection thus reducing the complication rate. It is highly advantageous for conducting interventional neuroradiological procedures. It also has facilities for carrying out angio-tomography and to add on a digital subtraction unit.

SERVICES

The department carries out all types of neuroradiological investigations with round the clock service to patients. The following figures speak of the increase in the work load. The number of patients investigated has increased from 5020 in 1975 to 9695 in 1984. The number of myelograms done has increased from 205 in 1975 to 608 in 1984. The number of angiograms done in 1975 was 794 which increased to 1047 in 1980. Since then it dropped to 872 in 1984, this drop being an universal phenomena. With the introduction of a C.T. Scan the angiography rate has decreased.

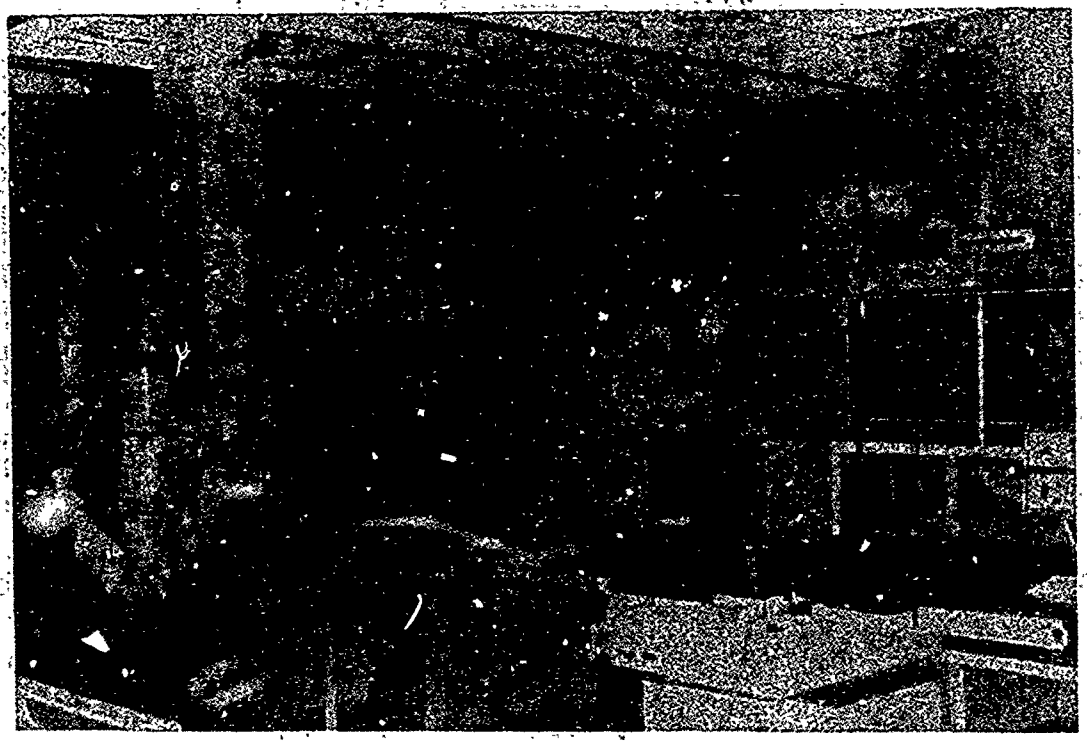
Neuroradiology Records

The department has a neuroradiology recording system which helps to retrieve the

X-rays of a patient within seconds once the patient's neuro-number is given. This helps in the follow up of the patient.

FUTURE PLANS

It is proposed to add a Digital Subtraction Unit to the present biplane angiographic equipment. This will help in providing advanced technology in investigation as well as photographs for research purposes. Efforts are being made to acquire a Nuclear Magnetic Resonance Scanner.



A view of Biplane Angiograph

Neurochemistry

It is one of the oldest departments in the Institute, having come into being in 1955 with the object of service, teaching and research. The service includes besides routine blood and CSF chemistrys, special tests like therapeutic drugs monitoring and hormone assays. Besides carrying out investigations during working hours, round the clock facilities are also made available for emergency biochemical investigations of diagnostic significance. Radioimmunoassays are offered as service facilities for patients. For this purpose a LKB gamma counter was obtained during 1984.

MANPOWER DEVELOPMENT

The department is involved in teaching neurochemistry to the postgraduate trainees of this Institute. In addition, this department has its own Ph.D. programme in neurochemistry. The Govt. of Karnataka is deputing candidates of medical colleges for pursuing Ph.D. studies in neurochemistry.

RESEARCH

Affective Disorders

A series of biochemical investigations were done on a longitudinal basis to understand the possible etiopathogenesis in patients with affective disorders. In patients with endogenous depression the levels of biogenic amine metabolites were followed before, during and after appropriate therapy. An initial decrease in the levels of biogenic amines were noted in many of the cases which raised with remission. The levels of cortisol and electrolytes were monitored to examine the circadian rhythms and no consistent pattern was noted, although the initial levels of cortisol were elevated. In manic patients, attempts were made to design a mode by which lithium could be administered to achieve optimal therapeutic levels without having the problem of frequent monitoring. This has been made possible by using body weight as a reference point. With a view to examine the possible reasons for side effects even at optimal doses, studies were made to examine the ionic fluxes. Using erythrocyte as a model system, it was noted that non-responders showed altered membrane permeability characteristics.

Mental Handicap

The biochemical screening of mentally retarded cases led to the detection of several cases with inborn errors of metabolism. In all these cases data relating to the genetic aspects were obtained. There appears to be a significant influence of consanguinity in the affected families specially in those with metabolic defects.

Spinal Arachnoiditis

Hyalase was administered in cases of spinal arachnoiditis (developing as a complication of TBM) therapeutically. In such cases, the CSF levels of hyalase were monitored using a modified turbidimetric enzymatic method.

Brain Tumours

In patients with brain tumours, specimens obtained at biopsy were biochemically examined with special reference to variations in isoenzyme patterns. It was noted that the isoenzyme pattern specially of LDH, closely paralleled histological alterations. Studies were also made to examine the variations in isoenzyme pattern in human fetal tissues at various stages of development. The results indicated that there is a

characteristic pattern during development. This data during human fetal development has not been reported earlier. This information is very vital for ontogenic studies of LDH isoenzymes. In order to understand the mechanism of aromatic amino acid hydroxylation, studies were made to evaluate the role of superoxide dismutase. For this purpose non-enzymatic models were employed. The enzyme was also assayed in tissue obtained from the nervous system of different species of animals. The preliminary studies indicate that the enzyme plays a significant role in hydroxylation mechanism.

Various research projects sponsored by ICMR and IMRS were undertaken during this period and studies on biochemical and genetic markers in schizophrenia and affective disorders; Biochemical and genetic studies in mental retardation; studies on lithium and head injury are in progress.

FUTURE PLANS

It is proposed to have a separate establishment for isotope work useful not only for diagnostic work but also for research; to set up clinical neurochemistry unit; to have facilities for sophisticated biochemical studies in some of the disorders seen locally; to have a set up which is adequate to undertake work in basic neurochemical problems since the Institute has now a central animal research facility.

Neurochemistry laboratory

Neuropathology

The Department of Neuropathology, started in 1956, has emerged as one of the well established units in its discipline over the last decade.

During the initial stages of the last decade, priority was given to service and training rather than research activities. Rapid strides were made in the subsequent years and the department has developed into a multi-functional unit. At present, it is one of the most recognised Neuropathology Centres in the country with the main objective of providing diagnostic service to the patients, teaching basic principles and recent advances in neuropathology to postgraduate students of different disciplines and conducting clinical and basic research in the field.

MANPOWER DEVELOPMENT

Regular teaching services for postgraduate students of DM Neurology, MD Psychiatry and M.Ch. Neurosurgery are being conducted from 1975 onwards. Weekly brain cutting sessions and slide seminars are unique to this centre helping in active interaction between the clinicians, neuroradiologists, microbiologists and pathologists for better understanding and management of patients.

Short term training programmes in Neuropathology was initiated from 1982 onwards for the out-station students. One to two batches of students from different States of India regularly benefit from these courses every year. The faculty of neuropathology have been actively participating in Continuing Medical Education Programmes conducted by the Karnataka State Branch of Indian Medical Association, Neurological Society of India and Indian Association of Pathologists and Microbiologists.

The department was initially looking after histopathology only, but since 1976, both blood bank and clinical pathology laboratory were also taken charge of. The same year an emergency laboratory was started and it was located in the neuro-centre, nearer to the operation theatre and post-operative ward. With the active collaboration of microbiology and neurochemistry departments, a round the clock service was made available for emergency laboratory investigations including blood bank service.

Blood Bank Service

Regular blood donation camps are being conducted to collect blood from voluntary donors in order eliminate professional donors. The relatives of the patients are encouraged to donate blood. From 1983 onwards, screening of the donor for hepatitis associated antigen has been introduced. A programme of mutual exchange of blood with other nearby hospitals especially the Kidwai Memorial Institute of Oncology in case of emergency has been developed. This has helped in having an inter-institutional cooperation in this vital service. Since May 1985 a scheme of collecting blood from voluntary donors has been introduced. According to the scheme, staff members of NIMHANS are donating blood once a month voluntarily. It is envisaged that this bold step taken by the staff members would solve the problem of scarcity of blood to a great extent.

Autopsy Service

The autopsy service was started at NIMHANS in 1975 and 14 post-mortems

were conducted during the year. However, during the subsequent years, round the clock service was made available and with the active efforts of clinicians and pathologists, the number of autopsies performed in 1976 was 146. Since 1978 on an average, 225 clinical and 250 medico-legal autopsies are performed every year. The brains and other organs collected are submitted to detailed pathological studies and are utilised to build up a museum for teaching purposes. Many interesting specimens of teaching value are provided free to various medical colleges in the country on request. This precious autopsy material is one of the largest assets for applied research and training in the field of neurosciences. In future it is planned to develop a brain bank of frozen human brain tissue for neurochemical and neuropharmacological studies.

Electron Microscopy Laboratory

The Electron Microscopy Laboratory is functioning since February 1982 after instal lation of the transmission electron microscope.The facility is being utilised by the department for research and diagnostic purposes. This facility is also extended to other departments of NIMHANS and other sister institutions in Bangalore involved in biological research. Apart from these, a few bioscientists working in plant pathology and other biological sciences from out-station laboratories avail of the facilities for their research projects. A Senior Scientific Officer with specialised experience in electron microscopic studies assisted by a technician provides technical help to various workers. It is planned to acquire a scanning electron microscope for freeze fracture studies shortly.

Histopathology Laboratory

On an average 500 neurosurgical biopsies are processed and reported every year. Rapid frozen section service initiated in 1976 is provided for the operating surgeon. Addition of scintillation beta counter, electro focussing equipment, microfluorometric and photometric attachments to Zeiss photo microscope III have added to the quality of work. In order to facilitate proper diagnosis of skeletal muscle diseases, enzyme histochemical and electron microscopic studies are being undertaken for the past two years, in addition to the routine histology. Also, elaborate methods are being employed in studying peripheral nerve biopsies. As a result muscle and nerve biopsies are received from different neurological centres of the country for diagnosis. Thus the department offers referral service in the field of neuropathology.

RESEARCH

Though the department is basically a service organ of the Institute, considerable emphasis is being laid on aspects of research on tropical and infectious diseases of the nervous system and neuro-oncology. In addition, from time to time some aspects of developmental biology were also investigated. As a general rule an inter-departmental and institutional collaborative approach is adopted.

In developmental aspects, intracranial embryonic veins in human foetuses were studied, with a special emphasis on the development of arteriovenous malformations. The existence of arachnoidal villi along the intraorbital portion of the human optic nerves was described. It is proposed that they have an active role in modulating intraorbital pressure and the evolution of the papilloedema. An ultrastructural study of the motor end plate and systemic organisation along the tail of a tadpole is in progress. This study provides an insight into the programmed cell death during the evolution and metamorphosis of the amphibian system. A long term project on the developmental neurobiology of frog and Drosophila has been undertaken recently with the objective of gaining insight into the morphological development with particular reference to synaptogenesis.

Karnataka State is a confirmed endemic zone for arboviral infections especially the Japanese Encephalitis. During the epidemic in 1979-80, nearly 40 human brains obtained at autopsy were studied indepth and pathomorphological features characterised. A synergistic effect of neurocysticercosis on the evolution and progression of the lesions was recorded. This was an important and major study in the country. The study is being continued.

Neural leprosy still continues to be a problem in tropics. An ultrastructural study of the dorsal cutaneous branch of ulnar nerve, on which neurophysiological studies have been conducted is undertaken. The lepra bacilli are found to have a prediliction of unmyelinated nerve fibres and the schwann cells in relation to these fibres. The significance of this observation in the evolution of the pathological lesions needs further probing.

A detailed study of the pathological changes in various lesions observed in neurotuberculosis is being done. The effect of shunt surgery on the cortical mantle and the associated pathomorphological lesions are assessed to examine the nature and reversibility of lesions. For the first time, the nature and degree of involvement of the intraorbital portion of the optic nerve has been characterised in neurotuberculosis.

In a study of animal experimental arachnoiditis effect of hyalase in resolving the lesions, appears to act on the ground substance binding the collagen. This opens up channels to partially re-establish the CSF circulation and help in reducing the pressure on the spinal cord. This animal model is considered to represent the possible mode of action in humans.

Neurocysticerocosis is one of the well-known causes for epilepsy and other neurological manifestations. The morphological types of lesions and their clinical manifestations are studied both at autopsy and biopsy with special reference to cysticercal encephalitis.

Psychiatric pathology is not well developed in the country. A limited clinicopathological study of dementia was conducted in which a spectrum of infective and degenerative diseases leading to this malady were noted. A few formalin fixed brains obtained from cases of schizophrenia and tardive dyskinesia are preserved for study. In future, attempts will be made to complement these with neuropharmacological studies on fresh frozen brains obtained at postmortem.

As a routine relatively uncommon brain tumours are those posing diagnostic problem and submitted for ultrastructural studies. In addition some immunocytochemical studies have been initiated. In collaboration with the neurochemistry department, the LDH isoenzyme pattern is studied, which has provided an insight into the metabolic state and biological behaviour of the tumours of different grades of malignancy. In experimental neuro-oncogenesis by N-methyl nitroso urea in rats, the evolution of the tumour from the preneoplastic stage to onset of tumour is studied, both by light microscopy and ultrastructurally.

A detailed electron microscopic morphological analysis of astrocytoma blood vessels is in progress. The tumour vessels will be compared with human foetal and normal adult cerebral vessels for a better understanding of the morphological basis underlying tumour associated cerebral oedema.

Histopathological study of the brains obtained from epileptics is undertaken to evaluate the extent of tissue damage. A few characteristic but not diagnostic alterations are observed in the neurolonal morphology (golgi preparation and routine staining) dendritic and synaptic density and their morphology. This is the first study undertaken in India on this important aspect.

In view of a large body of autopsy material available special thrust was given to study the cerebrovascular diseases from 1982 onwards. All the autopsied cases are reviewed

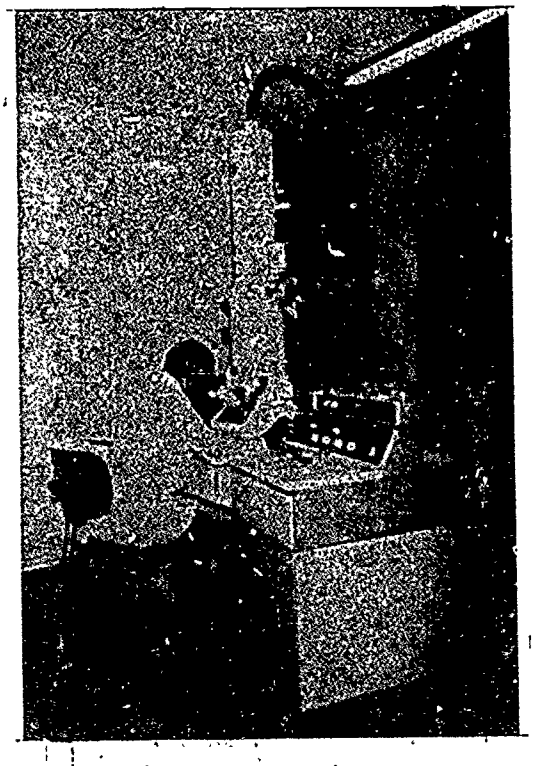
and codified to various categories. A detailed pathological study is in progress to establish baseline data about the magnitude of the problem and its relevance to clinical practice. The incidence of post-partum cortical venous thrombosis is high in young females causing significant mortality and morbidity. The cerebrovascular anomalies and aneurysms are fairly common contrary to earlier belief.

In the first five years, the main thrust was on developing the department into a service organ and establish training facilities, hitherto not available in this part of the country. Having achieved reasonable results and consolidated this aspect, both applied and basic research activities were undertaken in the next five years. The department has achieved the distinction of being one of the best centres in the speciality of neuropathology in the country. Keeping the national needs in view, tropical neurology continues to be the main thrust area of research complemented by studies in basic neurobiology.

In Progress

Clinical and laboratory studies on Rey's syndrome and other encepnalopathies in Bangalore–in collaboration with the Dept. of paediatrics, Vani Vilas Hospital, Bangalore Medical College are in progress.

Modulations of activities of the enzymes of one carbon metabolism and morphological and cytometric changes in exprimental and human cancer are under study in collaboration with the Dept. of Biochemistry, Indian Institute of Science.



Electron microscope in use

Microbiology

This is one of the new departments started during the decade—in 1977. The groups into which the activities of the department can be classified are:

(i) Microbiological and immunological diagnostic services for patient care, (ii) Teaching facilities to post-graduates of neurology and neurosurgery and (iii) Basic research facilities in the existing Central Nervous System infections as seen at the centre.

MANPOWER DEVELOPMENT

The department has practical training programmes for residents after postgraduation in microbiology and orientation to the students of neurosurgery, neurology and psychiatry.

SERVICES

Patient care is carried out by way of routine diagnostic services. A variety of samples viz., cerebrospinal fluid, brain abscess pus, wounds, swabs, urine, blood, sputum, etc., are received at this laboratory for a spectra of bacterial and fungal cultures. A series of serological and immunological tests are carried out on weekly basis. Some of the tests are VDRL serology test, widal test, rheumatoid factor test, C-reactive protein test, complement fixation test for cysticercal antibodies, serum immunoglobulin assay for IgG, IgA and IgM. These tests are being carried out to solve the puzzle of infectious diseases of the Central Nervous System. In most cases of pyogenic meningitis, the etiology is established in 80-85 per cent of the cases. This department also helps the clinicians to confirm diagnosis of tuberculous meningitis by isolation of Mycobacterium tuberculosis from the cerebrospinal fluid in a fair number of cases. The choice of antibiotics in any given case of the Central Nervous System infection is eased by the antibiogram test carried out at this department. Thus, a timely and accurate diagnosis in the Central Nervous System infection, saves many a life. Annually 10-15 thousand tests of various types are carried out for patient care and to help the clinicians. Since the last five years, cerebrospinal fluid cell cytology by the use of cytospin in infections like tuberculosis and in malignant metastasis of the brain have been carried out with highly promising results. The cerebrospinal fluid cytology in routine diagnosis of the Central Nervous System diseases has been established for the first time. The other new dimensions of microbiological analysis are the introduction of Gas Liquid Chromatography to aid in rapid diagnosis of meningitis and anaerobic infections. Since 1979 routine anaerobic cultures of brain abscess pus have been carried out and the role of metronidazole in brain abscess and other anaerobic infections has been established. For the first time the entity of anaerobic meningitis has been established by this project on anaerobic cultures. The routine fungal cultures of cerebrospinal fluid brain abscess pus has brought out some rare fungal infections like Cladosporium trichoides infections of the Central Nervous System and it has also helped to identify accurately all cases of cryptococcal meningitis (20 cases in 7 years).

The department in collaboration with other departments in the country like Department of Microbiology, All India Institute of Medical Sciences, New Delhi, C.M.C., Vellore, J.N. Medical College, Belgaum, School of Tropical Medicine,

Calcutta, Veterinary College, Hebbal, National Salmonella Phage Typing Centre, Maulana Azad Medical College, New Delhi, have helped in the accurate diagnosis of diseases like Toxoplasmosis, Brucellosis, Listeriosis, rare Streptococcal infections of Central Nervous System, Salmonella Meningitis and rare fungal infections of the brain.

RESEARCH

The areas of research in progress at the department are:

(1) Role of anaerobes in brain abscesses and meningitis
(2) Incidence of fungus in central nervous system infections.
(3) Immuno diagnosis of neuro cysticercosis.
(3a) Serum immunoglobulin assay in psychiatric disorders.
(4) CSF cell cytology in tuberculosis of central nervous system.
(5) Immuno diagnosis of TBM by monoclonal antibodies in association with Dr. J. Ivanyi, Immuno Biology Department of Wellcome Laboratories, U.K.
(6) Bacteriological etiology of Pyogenic meningitis.
(7) Role of GLC in diagnosis of meningitis.
(8) Incidence of C-reactive protein in CSF's of meningitis.
(9) Isolation of Mycobacterium tuberculosis in CSF's TBM cases.
(10) Anaerobic synergy in central nervous system infections.

A series of papers on the above mentioned projects have been presented. Several publications on these subjects have appeared both in national and international journals. The department has represented well in the National Conferences of Pathology, Microbiology, Neurology and Neurosurgery annually over all these 7 years.

FUTURE PLANS

It is envisaged to set up an extension diagnostic laboratory service at the New Psychiatric OPD block and a new Neuroimmunology section at this department to further sharpen and increase the spectra of diagnostic test for Central Nervous System infection and immunological disorders.

This Department is actively helping the establishment of a Neurovirology Department at this Institute which when established would be a great boon in solving the problems of diagnosis and prognosis in all neurovirological disorders.

Neurovirology

After repeated efforts to recruit the faculty since 1983 the Department of Neurovirology came into existence in 1985. At present the department is functioning as a part of the Microbiology Department. However, it will be shifting to its new location on the top floor of the administrative block. The new laboratory, one of its largest kind in the country, has been designed availing the help of certain leading virologists in the country from various institutions such as the National Institute of Virology, Pune, Christian Medical College, Vellore and the Pasteur Institute of India, Coonoor.

The objectives of the department are: (i) to provide routine diagnostic services such as virus isolation and antibody estimation; (ii) to conduct basic and applied research in the field of neurovirology with particular reference to diseases of public health importance in this country; (iii) to impart teaching to the postgraduate students of this Institute.

Work Done

In the past one year construction of the laboratory has been in progress and has reached a stage of completion. Further, the necessary equipments are being added. Despite the lack of a full fledged laboratory, serodiagnosis of Japanese Encephalitis (JE) has already been started and total of 30 samples were tested for presence of JE antibodies. Samples are also being forwarded through this department to other institutes for virological studies which are not possible here at present.

The postgraduate medical trainees are being given orientation lectures.

Staff Pattern

The department has been sanctioned the posts of a professor, a lecturer and two junior technicians. However, at present only a lecturer and one junior technician have been appointed. It is hoped that the other posts will be filled soon.

FACILITIES

The new laboratory complex has a number of facilities which include a P3 facility (high contaminent laboratory), cubicles for handling normal and infected cell cultures, an immunodiagnostic laboratory, a separate departmental animal house to keep virus infected animals such as monkeys, mice and rabbits. The equipment being purchased include Laminar Flow Cabinets, Ultra Low Temperature (– 85°C) Cabinets, CO_2 Incubator, High Voltage Electrophoresis apparatus, Chromatography equipment, ELISA equipment, Refrigerated Super Speed Centrifuge, Fluorescence Microscope, Inverted Phase Contrast Microscope and many others.

Future Plans

The department envisages to venture into a few collaborative research projects on Japanese Encephalitis such as (a) Interferon trials in Japanese Encephalitis cases and (b) Development of recombinant DNA probes for diagnosis of Japanese Encephalitis. It is hoped that these projects will be initiated before the end of 1986. The department also has plans to conduct seroepidemiological surveys in order to find out the extent of certain viral illnesses of the CNS. Another area of future research is on the aspect of "Viral hypothesis of mental disorders."

Long term plans are to convert this department as a reference laboratory for viral infections of the Central Nervous System in this country.

Psychopharmacology

The Department of Psychopharmacology was started in this Institute towards the end of 1983. The philosophy of this department is to create and develop a group of excellency in Molecular Psychopharmacology for its application in service, teaching and researches in the field of mental health & neurosciences. Appropriate infrastructure and laboratories are under establishment for the fulfilment of the aims and objectives of the National Institute.

MANPOWER DEVELOPMENT

This department actively participates in mental health manpower development by teaching and training of postgraduates in Psychological Medicine (M.D. & D.P.M), in the discipline of Psychopharmacology. An uptodate advanced course in the subject incorporating mathematical models, biophysical and molecular mechanism of drug action with special emphasis to psychiatric conditions is being conducted regularly. Teaching and training of professionals are also undertaken from time to time.

SERVICES

Quantification of psychotropic drugs and metabolites, and monitoring of neurohumoral and biologic markers in psychiatric conditions are the major responsibilities of the department. These biochemical and pharmacokinetic parameters are essential for patient care in the hospital. The development of psychopharmacologic models for understanding the etiopathogenesis of neuro-psychiatric conditions is the primary requirement to the choice of a rational therapy. This department bears the responsibility of developing and applying such models for better patient care.

At present the following analytic facilities are available. (a) High Performance Liquid Chromatography with electrochemical detection of sub-picomole quantities of neurotransmitter amines and metabolites in biological samples and tissues with specialised solvent extraction techniques. (b) A specialised LC technique with combined UV spectrophotometry for quantification of neurotropic agents has been standardized. (c) Enzymatic analysis methods using ultracentrifugation, IEF and column chromatographic methods have been established.

RESEARCH

Two major long term experimental research schemes have been initiated in the department with the limited facilities. They are: (a) The Molecular Dynamics of Neuronal Receptors. (b) Enzyme Regulation Systems in Brain. These schemes aim at understanding the biophysical, electrophysiological and neurochemical basis of drug action at a molecular level in the central nervous systems with the help of the following paradigms.

Drug Receptor – Ion Channel Interaction. The Patch-Clamp technique for single ion chennel recording is under development. Membrane signal transduction mechanisms and influence of drugs in the modulation of such information processing will be explored with the finest tools of molecular cybernetics and computer models.

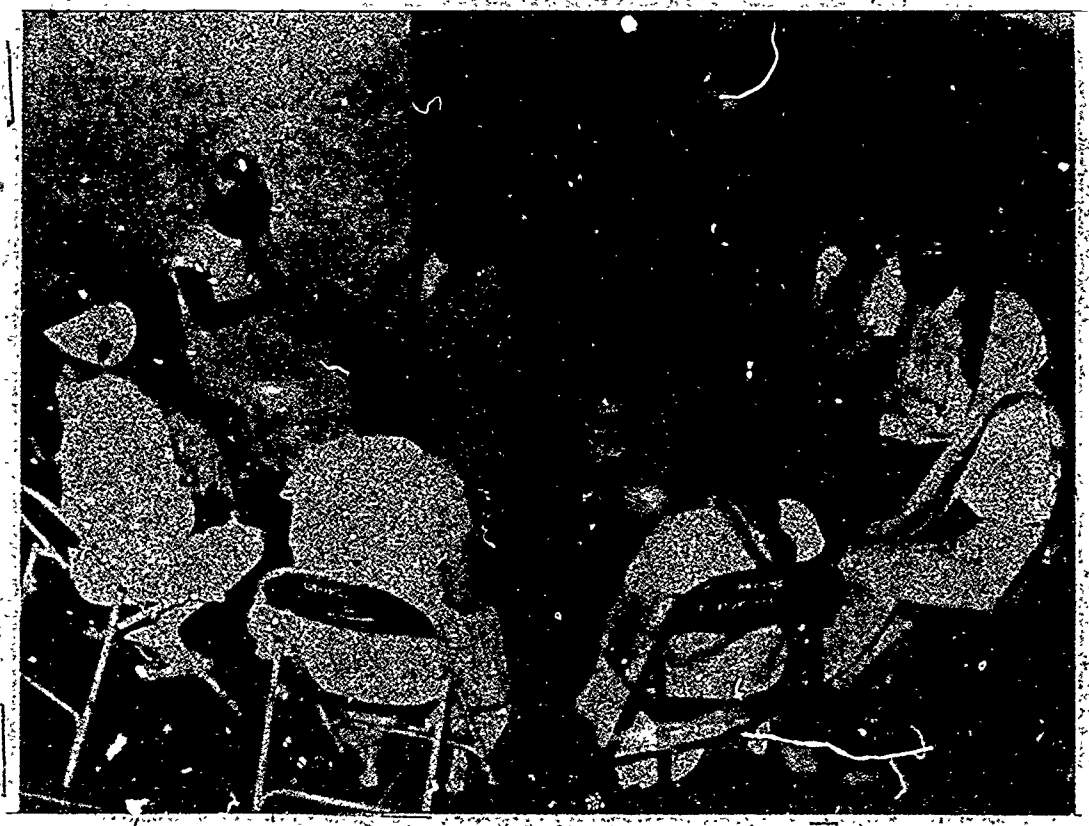
In Vitro *Reconstitution Techniques*: For a systematic exploration of molecular psychopharmacology different membrane and neuronal intracellular components are being isolated, purified and characterised by the methods of Density Gradient Centrifugation, Molecular Sieving Chromatography, Elec-

trophoresis, BLM and Liposomes.

Behavioural Psychopharmacology: The effect of drugs on behaviour in rats are being studied for understanding the receptor sensitivity under a variety of experimental conditions by computerised animal behaviour monitoring systems.

FUTURE PLANS

The department plans to provide post doctoral training in Membrane Biology, Molecular Psychopharmacology and Behavioural Pharmacology on a regular basis. It will also set up labs for visiting scholars and professors for sabbatical work.



Group interaction with chronic patients

Neurophysiology

The Department of Neurophysiology was started in 1975 with the appointment of Dr. T. Desiraju. Since its inception, the department has been striving to initiate and develop its programmes in keeping with the concept of an Advanced Centre of a national institute.

However, the progress could be significantly advanced only after the sixth five year plan (1980-85) was sanctioned by the government to the Institute for the first time. The overall objectives and the budget requirements (under the plan) for the department and for the animal house, were examined by the expert plan committee and recommendations approved. The main functions of the department are:

(i) To carry out original researches on high priority areas of national relevance on the nervous system;

(ii) To disseminate knowledge and teaching on the neurophysiological advances, techniques, methodologies, approaches and applications;

(iii) To train personnel in short-term training courses in neurophysiology and in long-term research degree programmes; and

(iv) To establish 'bridges' and ground for expert consultations and collaborations in multidisciplinary areas in brain research and neuro sciences.

The main areas of research investigations proposed to be undertaken include.

(i) Development of experimental models of brain disorders, and advancement of basic research in neuro sciences;

(ii) Researches on consciousness;

(iii) Nutritional effects on brain development; and

(iv) Toxins and other debilitating environmental agents and fertility control.

In furtherance of the objectives the next five year plan (1985-90) was formulated so that the future developments include the strengthening of the infrastructure already created. Among the most important priorities is the development of trained specialists to advance medical education and research.

MANPOWER DEVELOPMENT

Teaching in Neurobiology

The specially structured programmes integrating the current principles of brain development, functional morphology of neurons, synaptic physiology, mechanisms of working of the different brain areas and systems and of behavioural and conscious states, are delivered since 1976 to the trainees of DPN, DPM and MD (Psychiatry), DM (Neurology), M.Ch. (Neurosurgery) and M.Phil. (Clinical Psychology).

Training of Specialists

(i) Ph.D (Neurophysiology)

Soon after the establishment of research laboratories, the Ph.D. programme was initiated from 1980. Two candidates per year are admitted on a regular basis, apart from admitting sponsored candidates from other agencies and from those appointed on the research schemes. This is the first doctoral programme in the neurophysiology speciality started on a regular basis in India.

(ii) M.Phil (Neurophysiology)

In order to create necessary manpower in basic neuro sciences, M.Phil. (Neurophysiology) a 2-year pre-doctoral programme was started in 1982. As in advanced countries, the course is open for both medical and life-science candidates. As this is the first programme of its kind in the country, a great deal of effort is being invested to conduct the same on innovative lines.

(iii) Training for faculty members of other medical colleges

The department has been providing advanced educational training in the experimental skills to the faculty members deputed from other medical colleges. These categories include the short term visiting persons and also the long term deputationists for Ph.D. under the faculty development programmes.

RESEARCH

Establishment of technical facilities and knowhow

The department established one research laboratory during 1976 with some old and miscellaneous equipment collected from different places in the Institute. In this early laboratory, the preliminary and the exploratory research work of the project consciousness was initiated. The department was involved from its inception in building up of the animal house for animal experimental work. By 1983, the department established the following five actively working experimental laboratories:

(i) Human neurophysiology laboratory

(ii) Cellular and synaptic neurophysiology laboratory

(iii) Psychophysiology laboratory

(iv) Functional-morphology laboratory

(v) Neurotransmitters physiology laboratory

The department's research staff have also been regularly using about 1½ days in a week, sharing the common facility Electron Microscopy of the institute for carrying out the correlated E.M. work of the neurophysiology research projects.

Further Areas of Research

The infrastructure of the laboratories for human neurophysiology and animal experimental neurophysiology have been developed to pursue projects by the academic and research staff (currently about 25) falling under the following fields:

(i) Human thalamic neuronal physiology under clinical setting while treating parkinsonism etc. (starting shortly).

(ii) Physiology of Yoga

(iii) Effects of malnutrition on brain development

(iv) Psychophysiology of behaviour and learning somatic and automatic functions

(v) Morphological connections in the brain areas

(vi) Neurotransmitters physiology

(vii) Effects of environmental pollution on brain development

(viii) Abnormalities of the physiology of sleep states in the depressive illness

(ix) Neurophysiology of the primate cerebral cortex

(x) Growth, maturation, degeneration, and regeneration of nervous tissue

Highlights of some of the important applied research projects

ICMR supported project on Effects of malnutrition on brain development:

The project was started in April 1980 for a period of 3 years and has been renewed for another 3 years from September 1983. This project carries out experimental work using rats and monkeys to find the effects of

undernutrition on the developing brain, and to find whether rehabilitatory nutrition would restore the state of normalcy.

National Project on Consciousness

This project started in December 1976 has been making steady progress since 1980 with the development of laboratory with modern facilities for human neurophysiology work. After the initial efforts of exploratory ground work and standardisation of the methodological approaches needed for a complex area like this, the work began to be pursued in an intensified way. From April 1984, the ICMR has sanctioned a five year grant of a tune of overtwo lakhs per year, to support a major research project on the study of physical, physiological, biochemical and psychological aspects of the effects of yoga.

ICMR supported Project on Thermoregulation:

This experimental project was aimed to study the effect of succinylcholine on the hypothalamic thermoregulatory mechanisms to find whether succinylcholine has action on it, as it sometimes causes malignant hyperthermia in some patients. The project was conducted between 1981-1984. The study revealed that succinylcholine can act on the preoptic area leading to an hyperthermic effect. Based on this and other findings of the study, it has been postulated that succinylcholine might inhibit the warm sensors and the controls of the dual sympathetic mechanism which normally lead to an increase of sudomotor activity and a decrease on vasomotor activity, thus the inhibition contributing to the rise of the body temperature. The study is aimed to be extended on to the primate experimental model.

CSIR supported project on Electrophysiological Studies of Effects of Undernutrition on the Developing Brain of Primate:

This project started in 1984 is in progress.

Research in Areas of Clinical Neurophysiology

A project was initiated by the department during 1981-82 to study the nature of abnormalities of sleep states in mental illness, particularly in patients with manic depressive psychoses. The study conducted by the department was the first of its kind in the country on the manic depressive psychosis (MDP) patients. Such studies have been hitherto carried on only in the advanced countries. The results of the study already made showed that the MDP patients showed highly abnormal electrophysiological features of sleep states. They had almost no delta or the stage IV sleep and most of the sleep time was in the stages I and II (spindle sleep) and in the stage REM sleep. Another abnormality in them was the occurrence of REM sleep immediately following the wakeful state. The alpha was diffusely spread and choppy. The autonomic nervous indicators also were studied. A further substantive study is planned for the future.

Research projects in neurophysiology under the joint protocol of the agreement in medical sciences and public health signed by the Governments of India and Soviet Union:

Under the above agreement, it has been decided that joint researches on the subject of neurophysiological basis of emotional stress and resistance mechanisms have to be conducted. Two of the projects under this agreement require animal experimentation, and the third one is concerned with the study of effects of yogic techniques on human physiology and their application for prevention of emotional stress consequences. These projects are being planned to interact in the most fruitful manner with the corresponding scientists of the Soviet side.

Other activities

Prof. T. Desiraju is functioning as the editor of the Indian Journal of Physiology and Pharmacology (IJPP).

FUTURE PLANS

A laboratory is being set up for doing clinical neurophysiology for monitoring electrical signals of deeper parts of the brain while the neurosurgical procedure is carried on the patients for treating parkinsonism by Dr. R. M. Varma and colleagues.

Facilities for studying neurophysiological changes of human brain and body functions during yogic pranayamas, meditations, sleep-dream states, etc. Subject is investigated in the sound-proof airconditioned cabin (A), by monitoring behaviour through closed-circuit television, EEG telemetry, Kirlian imaging, Polygraphy of various parameters, evoked potentials, on line control and analysis with computer (B), and studying metabolic rate (C).

Neurophysiology facility (D with B) for monitoring human thalamic and basal brain neuranal electrical signals during operation on a patient by percutaneous thalamotomy to treat parkinsonism.

Biophysics

The Department of Biophysics was re-opened in November 1974, after a gap of almost 10 years, with the appointment of Dr. S. V. Talekar as lecturer who initiated research in the field of biomembranes and carried out some interesting studies on the ion selective permeability. With his demise in 1981, the department suffered a great loss.

Subsequently, Dr. Viney Jain was appointed as Professor. New laboratories for the department were constructed and the department shifted to the new premises in June, 1984.

Objectives

The objectives of the department are : (i) to carry out research in pure and applied biophysics with special reference to neurobiology and mental health sciences, (ii) to develop teaching programmes for training in biophysical sciences, and (iii) to participate in the institutional programmes for providing efficient patient care.

MANPOWER DEVELOPMENT

The department offers training to Ph.D. students of the Bangalore University. A two year M.Phil. (biophysics) course has been approved by the Bangalore University and will commence from September 1986.

RESEARCH

Neurobiophysics

Selective ion permeability through membranes plays a central role in the generation and propagation of nerve impulse. Theoretical studies carried out in the department led to the formulation of a model where selectivity is a function of the difference in the activation energy for diffusion of ion in water and that of the self-diffusion of water, thereby arriving at a selective ion-current equation in which the property of negative conductance is inbuilt.

Biomedical Instrumentation

An assembly (based on the filter trap technique) was designed and fabricated to increase the capture of cellular or microbial elements in **in-vivo** diluted samples of CSF. This assembly can be useful for CSF analysis in remote rural areas where laboratory facilities are not available. (2).

Neuro-oncology

Cancer Prevention and Detection:

Environmentally induced DNA damage and capacity of its repair in the living cells, profoundly influence important biological processes like mutation, ageing, malignant transformation and cell death (Fig. 1) Reliable data on genetic damage induced by environmental agents in mammalian, including human systems are needed to detect and identify environmental pollutants and to arrive at correct estimates of risk. To facilitate this, we have developed flow-cytometric techniques for precise measurements of cellular DNA content and its dispersion in human cell populations (3, 4). These automated techniques can provide quantitative and objective information and are also useful in the diagnosis of brain tumours (4, 5).

Theoretical studies on tumour growth and response to treatment:

A simple mathematical model for tumour growth and its perturbation by radiation has been formulated to understand quantitatively, the role of various repair and cell kinetic processes in determining the response of tumours to treatment. The

model can be simulated on a microcomputer and the responses to various radiation regimens can be theoretically calculated. The agreement with the experimental data on transplantable tumours in labora- tory animals is quite satisfactory (6, 7). These studies will be helpful in investigating the effects of various radiation sensitizers and in formulating optimal radiation therapy regimens on a rational basis.

Use of 2-deoxy-D-glucose to differentially enhance radiation damage in brain tumours:

Cellular repair processes are known to require metabolic energy. 2-deoxy-D-glucose (2-DG), a glucose analogue and an inhibitor of glycolysis, has been shown to differentially inhibit repair of radiation damage in cancer cells (8). Experiments carried out on organ cultures of brain tumours have shown that the frequency of gamma ray induced micronuclei and DNA content dispersion increase significantly, if 2-DG is present for a few hours after irradiation (Fig. 2). The proposed mechanism of action underlying this phenomenon is schematically shown in Fig. 3. These observations suggest that administration of 2-DG could be used to enhance radiation damage and thereby improve radiotherapy of brain tumours (9). Clinical trials to verify this possibility are planned.

FUTURE PLANS

Medical Biophysics

Neuro-oncology:

Research work directed towards developing new biophysical techniques for improving therapy of brain tumours will be continued. In particular, emphasis will be to develop: (i) non-invasive techniques for monitoring quantitatively and objectively the therapeutic response in brain tumours, (ii) photo-therapy, using photosensitizing dyes and light for treatment of brain tumours and (iii) optimization of cancer therapy using glucose analogues in combination with cytotoxic agents.

Neurobiophysics

Bioenergetics and cybernetics of the nervous system:

Energy metabolism plays a crucial role in the functioning of the brain. Recent work has shown that a very tight coupling exists between the energy yielding and energy consuming processes in the nervous system. The underlying mechanism for this tight coupling are not yet precisely known. The aim of our work will be to investigate these mechanisms and to study quantitatively the relation between the energy metabolism and various stages of information processing in the nervous system in health and disease. During the first phase of this research programme, suitable techniques will be developed and studies will be carried out **in vitro** and **in vivo** model systems at various levels of organization. Work on non-invasive techniques to study the energy metabolism of living systems using 31-P NMR spectroscopy has been initiated for this purpose (10).

Molecular and Cellular Biophysics

DNA damage and repair in neurological and mental disorders:

There is considerable circumstantial evidence suggesting that a number of neurological and mental disorders could be caused by defects in the DNA repair capacity. Accumulation of DNA damage may also be responsible for ageing. Research in this field has been hampered because of lack of adequate techniques for measuring DNA damage and repair in brain cells. Therefore, suitable techniques to measure error-free and error-prone DNA repair in various types of brain cells will be developed. Relationships between chromatin structure, membranes and DNA repair and metabolism will be studied. Attempts will be made to develop methods by which error-free DNA repair could be enhanced. This could help in reducing the symptoms of the disease. If DNA repair defects can be detected early, it may be possible to even prevent the development of the disease.

*References provided under "Publications of the staff"

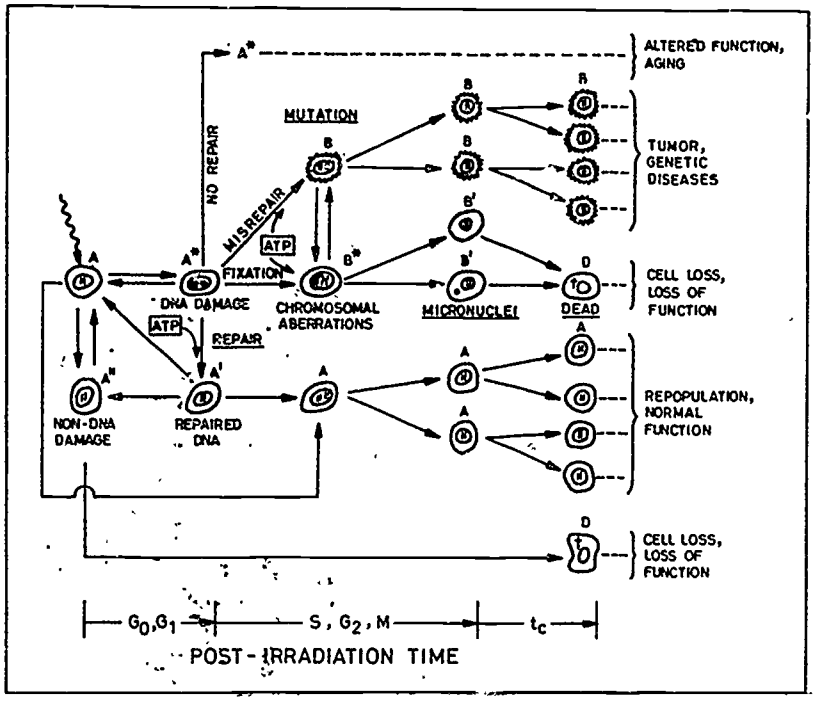
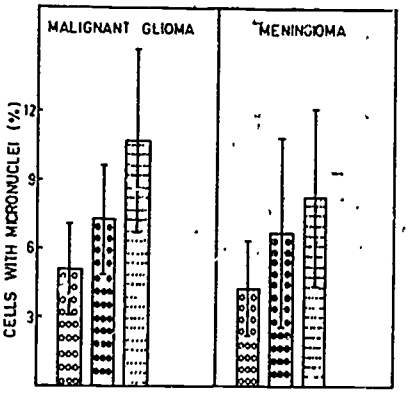
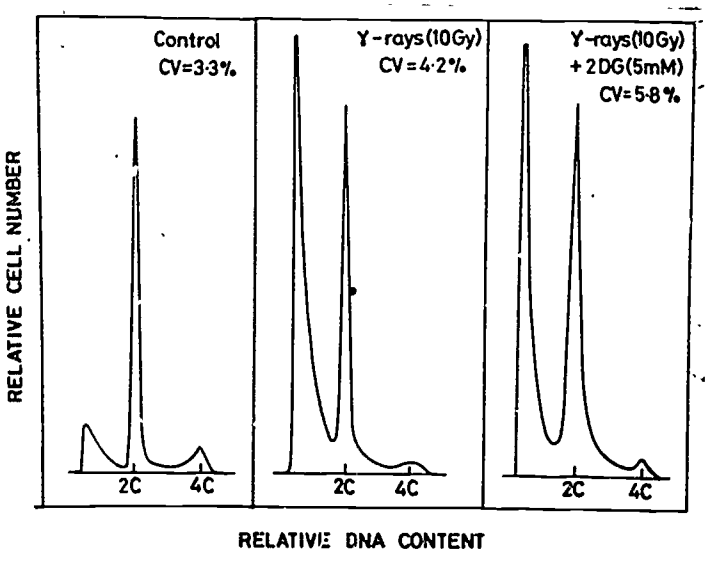


Fig.1 Cell dynamics following DNA damage induced by environmental agents.

Fig 2 (a) Effects of 2-DG and gamma-rays on (a) the micronuclei frequency and (b) DNA content dispersion (CV) observed in organ cultures of human brain tumours.

Fig 2 (b) Effects of 2-DG and gamma rays on the (a) micronuclei frequency and (b) DNA content dispersion (CV) observed in organ cultures of human brain tumours.





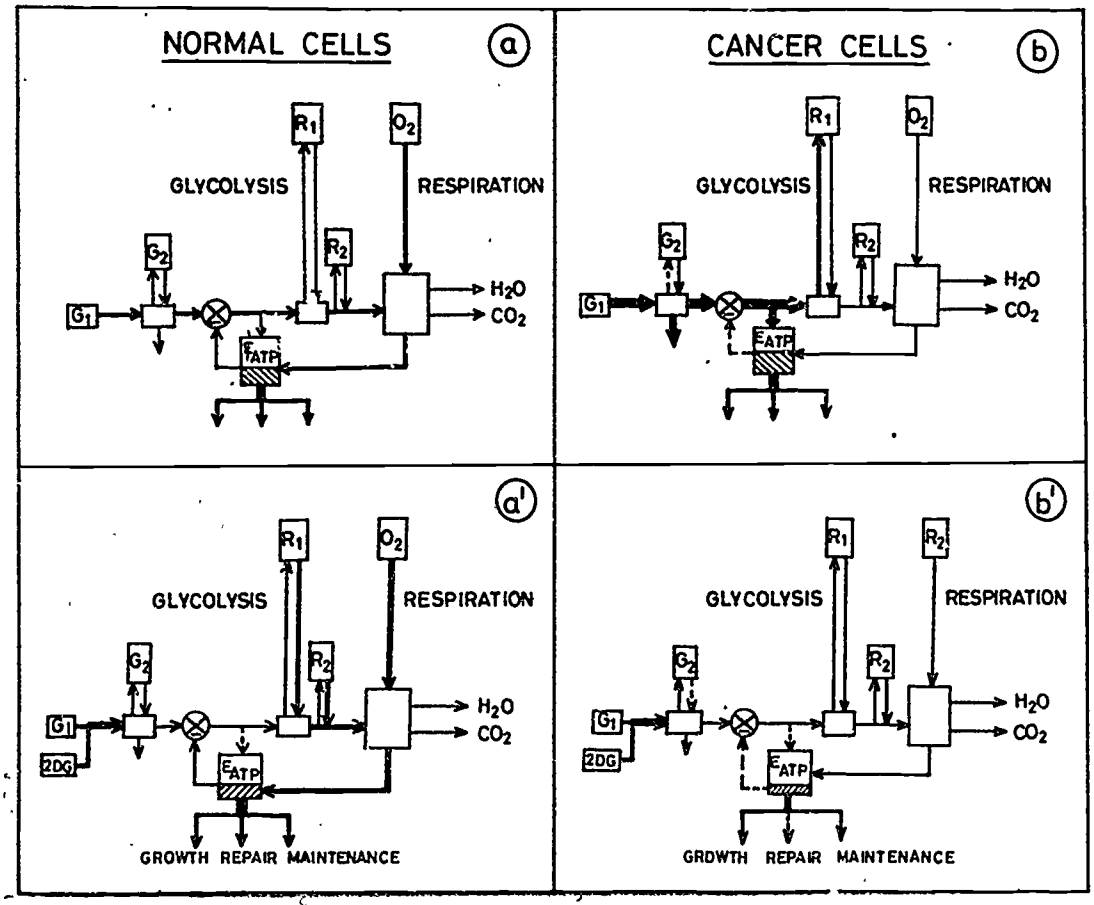


Fig. 3 A simplified model showing the patterns of energy supply and their modifications induced by 2 deoxy-D-glucose (2-DG) in normal and cancer cells. The cellular repair processes are inhibited in cancer cells in the presence of 2-DG because of drastic reduction in the rate of ATP production

Biostatistics

Realising the scope of biostatistics in the field of medical research in general and in the development of psychometric and biometric methods in particular, the department of biostatistics was established in 1954.

Objectives

The main objectives of the Department are to:

Train the postgraduate students of this Institute in biostatistical, computational and research methods,

Provide consultative services on statistical matters to medical, biological and behavioural scientists,

Co-ordinate and standardize the collection of medical statistics and other relevant information in this institute,

Provide a statistical basis for planning programmes designed to advance mental health and neurosciences and the well being of the people,

Extend statistical service and assistance to the institutions involving the study of mind and brain,

Develop a data bank for mental health and neurosciences,

Encourage research activities by introducing computer oriented statistical methodology to analyse and interpret data pertaining to the field of mental health and neurosciences,

Encourage advanced research in biostatistics particularly the statistical producers in behavioural and biological studies and

Develop a bank of relevant literature pertaining to methods in psychometrics and biometrics in terms of journals, books, reprinted research papers and index codes.

Equipment

The staff of the department were using computers installed at the Indian Institute of Science, Bangalore and Indian Institute of Technology, Madras for their analysis of research data. The department acquired a computer of its own in 1982. A SPECTRUM/7 with 64 K memory, four floppy disk drives, CRT and dot matrix printer was added along with a data entry machine SPECTRUM/31 with 48 K memory and one disk drive. SPECTRUM/31 was later upgraded with CRT and printer. A key to tape unit was also added.

One MOSCAL 1185, an electronic calculator with 1000 steps programmable facility and 1000 steps data register, three MOSCAL 1402 calculators (statistical) and four COUNT 06 PPD electronic calculators were also obtained for use in the statistical laboratory.

MANPOWER DEVELOPMENT

The staff of the department have been teaching one full paper in Methods of Clinical Research to the students of M.Phil. in Medical and Social Psychology, one full paper in Methods of Social Work Research for students of Psychiatric Social Work and part of a paper in Biostatistics to students of M.D. and D.P.M. in Psychological Medicine. Every year lectures are offered to the trainees in D.M., M.Ch. and Ph.D.

Along with lecture schedules in the theoretical and applied statistical methods, practical classes were introduced to the students of M.Phil. courses in Medical and Social Psychology and in Psychiatric Social work. The syllabus for the above courses was revised more than once during the last decade to suit to the modern trend in

research methods and applied statistics.

Consultancy Service

Statistical consultations and services have been offered to the students for their course studies and to the staff in their research work. During the last ten years 27 Ph.D. theses, 53 M.D. theses, 7 D.M. theses, 6 M.Ch. theses, 22 D.P.M. dissertations and 98 M.Phil. dissertations were assisted by this department.

Consultancy and Service to other Programmes :

As part of the National Mental Health Programme, the ICMR has sponsored several multi-centre projects at NIMHANS. Of these for three multi-centre projects Mr. V.G. Kaliaparumal has been appointed as the statistical co-ordinator. The following three projects have been successfully completed :

1. Evaluation of the training programme of training the non-psychiatric doctors in psychiatry.
2. The pattern of child and adolescent psychiatric disorders.
3. Severe mental morbidity survey and integrating mental health programme into the general health care.

RESEARCH

The staff of the department are involved in a number of research projects of the clinical departments. One major research project was on 'The seizure prognosis of patients with epilepsy" which resulted in developing a number of models to predict seizure outcome for patients with "Primary generalized seizures" "Simple partial seizures" and "Complex partial seizures". Models were developed for each of three groups and also for the aggregate group. "Long-Term", "Medium-Term" and "Short-Term" prognosis were considered. Furthermore, an "Index of Improvement" was also developed. A number of multivariate statistical methods such as Multiple Regression Analysis, Simple and Multiple Discriminant Function Analysis, Cluster Analysis, Principal Component Analysis, Factor Analysis and Path Coefficient Analysis were employed together with univariate statistical methods. The following is one of the prediction models developed :

Model to predict long term prognosis of patients with epilepsy

Predictors	Scores
Regular medication	
Regular for four years	3.172
Regular for three years	2.379
Regular for two years	1.586
Regular for one year	0.793
Irregular	0.0
Sex	
Male	1.039
Female	0.0
Autonomic phenomena	
Present	1.5
Absent	0.0
No. of attacks	
Twenty or more	0.861
Less than twenty	0.0

Decision Rule:

If the sum of the score is 2.9 or more the patient is deemed to be in good prognostic-class. The uncertainty in the decision is 24.0 per cent.

Hospital Statistics

During the last one decade in particular, hospital statistics have been compiled periodically. From 1980 onwards, detailed information about in-patients, viz., date of registration, date of admission, age, sex, income, religion, education, occupation and outcome of admissions have been computerized. Computerized data are also available for the outpatients regarding basic demographic variables. Detailed informa tion on deaths in the hospital is also computerised.

Computer Utility

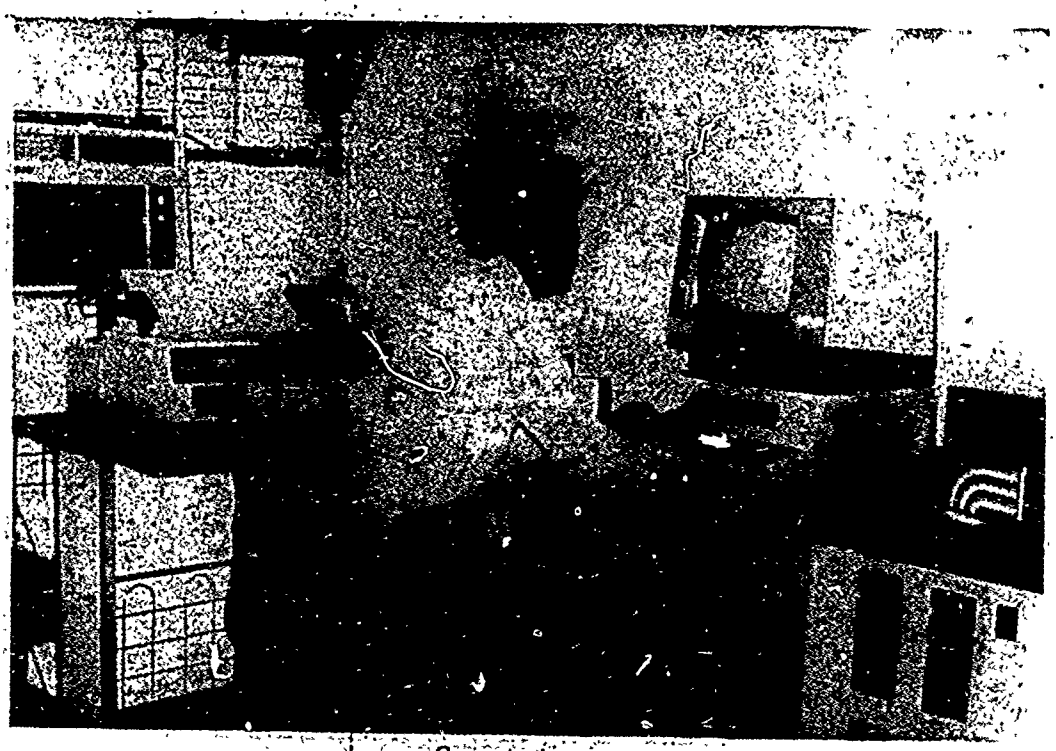
A number of programmes have been developed for multivariate and univariate statistical analyses to use with SPECTRUM/7 and SPECTRUM/31 computers. Several subroutines along with other programmes in statistical analysis have been developed.

The addition of a computer to the department added more facility which stimulated more and more research projects and sophisticated statistical analysis. This

computer is being used by more than twenty project staff.

Students, staff and all research project staff are using the computer throughout the year. There is an urgent need for a better computer with large memory and multi-terminals, tape drives and line printers. Attempts are being made tc computerize library information and accounts of the Institute.

Application of multivariate statistical methods for a number of Ph.D. and M.D. theses is enabled with the installation of a computer in this department.



Computer in use

Cytogenetics

The study of genetics in unravelling the hereditary disease is an important subject, specially in the field of mental health and neurosciences. Human genetics plays a key role in establishing etiological and characterization of the disease or defect. Since a Mental Retardation Clinic is run on a specific day at NIMHANS, the registry of 1,000 to 1,200 new cases per year and nearly 100 other familial psychiatric and neurological disorders are referred from other disciplines, genetic investigation is necessary for proper diagnosis of the case. Most of the subjects with mental retardation and other familial disorders are worth studying for cytogenetic investigations and thereby to some extent helps in establishing the etiology of the disease. Keeping in view the need of the discipline of genetics in mental health in order to cater to the needs of teaching, research and training in human cytogenetics, the department of cytogenetics was established during 1983-84.

The objectives of the department are: (i) To carry out a systematic cytogenetic investigations and to record chromosomal anomalies in various syndromes; (ii) To establish the etiological factors in causation of the diseases, (iii) To utilise the available information for purposes of genetic counselling, (iv) prevention of mental retardation and management of the mentally handicapped and (v) To carry out cytogenetic investigations in some of the malignant brain tumors for characterisation.

MANPOWER DEVELOPMENT

The department is actively enaged in teaching the basic aspects of genetic and the field of human cytogenetics for the post graduate students of other disciplines. The results of the cytogenetic investigations are used for discussions during the case conferences and presentation.

It is planned to conduct journal club reviews, seminars pertaining to the field of human cytogenetics for updating the recent informations accrued.

FACILITIES

The Department is equipped with most recent and sophisticated equipments to conduct researches in the field of human cytogenetics. Provisions are also made for studying the routine chromosomal analysis, prenatal diagnosis, dermatoglyphic studies and studies on the cytogenetics of malignant brain tumors. The department has facilities for cell culture studies also.

SERVICES

The cytogenetics laboratory is providing diagnositc services for the referrals from Mental Retardation Clinic and for other familial neuropsychiatric disorders.

RESEARCH

Research on the following areas of interest is on hand:

1. Cytogenetic investigations of the mentally retarded and in other familial neuropsychiatric disorders.
2. X linked mental retardation (MR) among the unspecified group of M R subjects.
3. Studies concerning the dermatoglyphic pattern of the cases for correlation with the genetic findings.

FUTURE PLANS

Expansion of activities on the following research programmes are envisaged.

(i) Providing prenatal diagnostic services for the families having a high risk of recurrence of the disease, (ii) Cytogenetic investigations in malignant brain tumours and its characterisation, (iii) Understanding the genetic mechanism in some neuro and psychiatric disorders.

Central Animal Research Facility (CARF)

The animal research laboratory came into existence in 1980, largely due to the efforts of Dr. T. Desiraju, who strived hard to bring it up. It has been designed in consultation with leading institutions such as Indian Institute of Science, Bangalore and National Institute of Nutrition, Hyderabad. It has been functioning as a central facility for all the departments of the institute providing opportunities for animal research work.

Activities

Apart from maintenance of laboratory animals and birds, the CARF provides all facilities and assistance to the researchers of various departments. A total of 8 departments which include Neurophysiology, Neurochemistry, Neurology, Neurosurgery, Neuropathology, Psychopharmacology, Microbiology and Neurovirology are utilising the facilities provided by the CARF at present. Various other departments are coming forward requesting space. The CARF has also been supplying animals (rats and guinea pigs) to some institutions in Bangalore and elsewhere in the country on a non-profit basis.

The year-wise distribution of the various animals and birds being maintained in the CARF since its inception is indicated in Table-1.

Facilities Available

The facilities available at the CARF include a room housing a balance accessible to all workers, a refrigerator, a dissection table and surgical instruments, facilities for staining, microscopy, steam sterilization, incineration, and preservation of carcasses in a deep freeze. A biorythm room is being constructed for common use to enable behavioural studies of rats. Funds to construct another floor have been sanctioned in the Seventh Five Year Plan for providing more facilities.

Primate Unit

Over the past five years a total of 130 bonnet monkeys have been procured by the CARF. These animals were used for malnutrition and development studies and neurotoxicological studies by the departments of Neurophysiology and Neurochemistry respectively. Eleven animals were born in captivity dur this five year period.

Small Animal Unit

To start with, this unit was housing only Wistar strain of rats and Swiss albino mice. Later a number of other species such as rabbits, guinea pigs, golden syrian hamsters, cats and sprague-dawley strain of rats were added on to this unit. These animals are being used for malnutrition, behavioural, toxicological, oncopathological and immunological purposes by various departments. In addition some of them are used for practical demonstration classes of students by the departments of neurophysiology and neurosurgery.

Kennel

An improvised kennel to house 10 dogs was established in 1984. The departments of neurophysiology and neurosurgery are using these animals for the purposes of practical demonstration and experimental surgery respectively.

A new kennel with facilities for an operation theatre and post operative care unit is being planned.

Aquarium

This has facility to house fishes, frogs and

tadpoles. However at present only frogs are being maintained. They are used by the depart ments of neurophysiology, neuro-chemistry and neuropathology for various purposes.

Birds

Ducks are being maintained in the CARF collecting red blood cells for use in diagnostic virology. Chick embryos are also being maintained for certain arterio-venous malformation studies being conducted by the department of neurosurgery.

Table 1—Total No. of Animals maintained at the Central Animal Research Facility

Animals	No. of Animals					
	1980	1981	1982	1983	1984	1985
1. Rats	41	251	502	1286	1486	1807
2. Hamsters	—	—	24	86	55	12
3. Mice	39	27	32	71	54	105
4. Guinea Pigs	03	12	16	11	01	12
5. Rabbits	20	24	44	33	14	30
6. Cats	02	24	29	15	5	22
7. Dogs	04	—	—	02	20	21
8. Monkeys	02	29	23	48	51	61
9. Fish	—	—	—	—	48	—
10. Frogs	—	—	—	—	64	233
11. Lizards	—	—	—	—	—	24
12. Ducks	—	—	—	—	—	02
13. Chicken	—	—	—	—	—	01

Library and Information Services

The Library and Information Services, started with the establishment of the All India Institute of Mental Health has been planned to collect, preserve, disseminate and exchange information required for the progress in the field of the mental health and neuro-sciences all over the country.

The library has grown in size and scope of service in consonance with the Institute itself in the last ten years. Being the library of the National Institute in the area of mental health and neuro sciences, it has an important responsibility of building up a strong document collection base, in order to ensure the availability of one copy of every worthwhile publication in mental health and neuro sciences published anywhere in the world.

In the last ten years, the number of journals subscribed to has increased to 305. About 1500 volumes are added every year. The special collection includes books on Indian philosophy, Yoga, Upanishads. Tantric & Mysticism, Indian medical system and epics besides books in the different disciplines of neuro sciences. The rich collection of the library continues to be used not only by medical, paramedical, and scientists of the Institute, but also by a large number of scientists and researchers from several parts of the country.

In order to supplement the library resources, regular collaboration has been established with many international libraries such as National Library of Medicine, U.S.A., National Institute of Mental Health, U.S.A., National Institute of Alcoholism and Drug Abuse, U.S.A., National Translation Centre and World Health Organisation, Geneva. A large number of publications from these organisations are being received regularly. A number of back volumes of journals are being received through the Exchange Scheme of Medical Library Association (USA). Many journals are also being received in exchange for NIMHANS JOURNAL.

Prof. T. K. S. Iyengar, Librarian, Indian Institute of Science, has helped for the development of this library as a Consultant and Chairman of the Library Committee. A blueprint of a computerised National Information Centre, in the field of mental health and neuro sciences, was proposed. This information service has the objective of supplying latest information to all specialists, scientists and reseachers working in this area throughout the country. The plan is under active consideration.

The expanded services developed in the last ten years are: (i) Reference Service, (ii) MEDLINE Searches (with the assistance of W.H.O.), (iii) Bibliographic Service, (iv) Reprography Service, (v) Inter-Library Loan and (vi) Reprint Procurement.

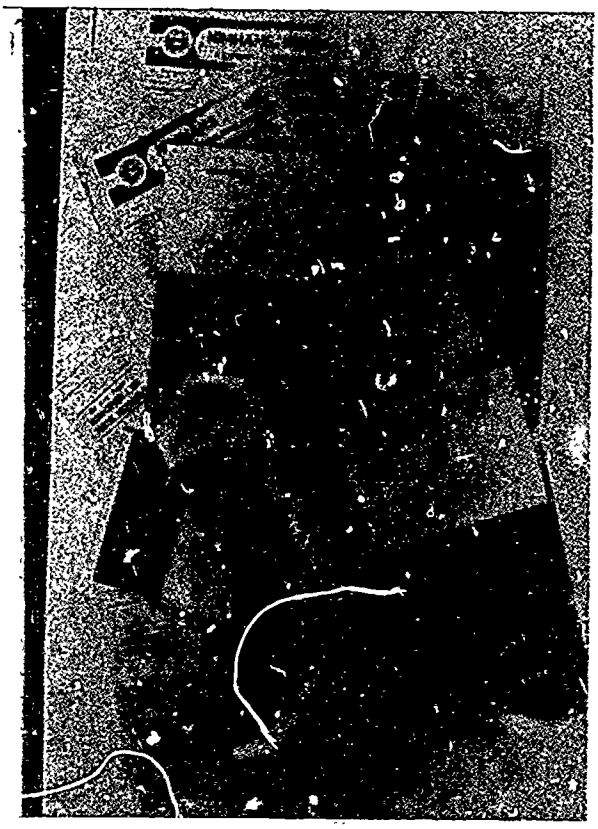
The reading room provides biomedical reference and is intended for the use of professionals, students and research workers. Control and circulation section is identifying and retrieving materials required by the library patrons and also on Inter-Library loan. The library has co-operative arrangement with many other libraries in and outside Bangalore and assists in procuring photocopies of papers in India and abroad.

Now, the library has automatic photocopying machine, micro film-cum-microfiche reader, electronic scanner and electronic typewriter.

FUTURE PLANS

Development of National Information

Centre in Mental Health and Neurosciences is envisaged in the near future. A full-fledged new library building is planned and construction of the same will be taken up shortly.



Publications

An integral part of any research/service institution is the publication activity. Publications have become inescapable components of the working of all institutions in general and research and service organisations in particular.

In furtherance of the objectives of undertaking publication of journals, research monographs, leaflets and textbooks, collecting, organising and publishing knowledge about mental health and neuro sciences enshrined in the Memorandum of the Association, efforts were made to rejuvenate publication activities soon after the emergence of the National Institute in 1974. Several proceedings of international and national seminars and conferences were brought out.

As a further step in the development of the publication activities, a separate department of publications came into being with the appointment of the assistant editor in December 1981. As a logical step, a systematic programme of publication comprising information booklet for visitors, newsletter for internal communication, journal for research communication, annual reports and proceedings of international and national conferences and seminars were initiated. Annual Reports, NIMHANS NEWS (fortnightly), Calendar of Events (annual) are being published regularly since then. Several proceedings of seminars/symposia held at the Institute have been published, a list of which is given at the end.

NIMHANS JOURNAL was started in January, 1983. It carries papers in the field of mental health and neurosciences in its broadest sense. The journal since its inception has been coming out exactly on the cover date. It is being published in January and July every year. At present, it is in its third volume. Subscription is increasing, exchange of other journals is encouraging and contribution by the faculty of the Institute is overwhelming. Encouragement by professionals and research workers elsewhere is prompting us to increase its periodicity in the near future.

In order to cater to the local community also, efforts are being made to publish literature on mental health in Kannada language. In this direction, a book on 'Mind and Mental Illhealth' a collection of popular writings in Kannada has been brought out and is being made available to those interested at a subsidised cost. Keeping in view the multi-disciplinary approach of the Institute, publications of varied nature are being ventured.

Expanding of publication of literature on mental health, publishing popular books for the benefit of the common man are planned. Establishing a separate Mental Health Exhibition for the visitors is also envisaged.

Medical Illustration and Audio Visual Aids

Medical Photography Unit as it was initially known, was first instituted in January 1955. It was a section by itself and manned by a photographer. To improve the service, the unit was placed under the guidance of the neuropathology department in 1974. Since then, the technical staff has increased. A senior photographer, an artist and a dark room assistant are working and the unit has been renamed as Medical Illustration and Audio-Visual Aids Unit. The unit is geared to provide modern medical teaching aids by way of photography and artistry. It is equipped with Bolex super 8 mm and Bolex 16 mm reflex cameras for movies and Ashahi Pentax 35 mm and Mamiya 120 mm camera for still photography. Ashahi and Mamiya cameras have tele and wide angle and close up lenses. Excellent quality developing and printing is possible in the adjoining lab, where an Agil 35 mm enlarger and Illford strip printer are used. The studio has an umbrella flash light to avoid shadows while capturing clinical photographs.

The unit caters to the needs of all the departments in the Institute and covers all official functions. It also undertakes screening of cini and clinical movies for patients and staff of NIMHANS. The photo artist provides adequate help for exhibiting clinical material by way of charts and slides at national and international conferences.

It is proposed to acquire a VCR unit as well as equipped lab for colour film processing, for proper documentation of clinical material.

Studio with umbrella lights

Biomedical Engineering Section

Biomedical engineering is an emerging field which is concerned with application of engineering technique and principles to medicine and biology. NIMHANS is one of the few institutions which has taken lead to establish this department. Although this department was formally established in 1982, clinical engineering works of the hospital and the Institute were being done by a central workshop since 1964 and the same was merged with this department on its inception. Necessary infrastructure for the development of the department were provided. Additional accommodation was provided over the old workshop building to set up a modern instrumentation laboratory and all basic electrical and electronic testing and measuring instruments and all machineries for the mechanical workshop were procured. In addition to the bio-engineering activities, this department has been asked to take up the clinical engineering works also, with the following objectives:

To design and develop hardware and software instruments to support research and clinical programmes.

To familiarize the application of electronic and instrumentation techniques for medical professionals.

Repair and servicing of electronics, electrical and electro-mechanical instruments and equipments.

Manufacturing and upkeeping of all furnitures of the hospital.

Regular calibration of the equipments as per specifications and international safety rules.

To keep accessory, spare parts, circuit diagrams, operational manuals, service manuals, etc.

This unit acts as liaison between purchase section and other departments and also finds out providing the servicing facilities, spare parts, circuit diagrams etc., to other departments.

A separate annual budget has been allocated for the procurement of spares, components and equipment for the maintenance and servicing works.

SERVICES

A number of development projects in the area of medical electronic instrumentation in collaboration with various departments have been taken up two specialised hardware instruments have been developed to study respiratory muscle coordination and impedence measurements during ECT.

Preventive maintenance and safety devices have been introduced for all the equipments as a compulsory measure and strictly followed to avoid frequent breakdown. 450 KVA servo controlled 3 phase voltage stabilizers have been installed in the power house of the Neuro Centre and the Institute building to avoid surge and fluctuations in the power supply system.

Repair and maintenance of all electrical and electromechanical items like autoclaves, medical air compressors, mechanised laundry machines, boiler, central suction pump etc. were carried out, which considerably reduced the down time and maintenance cost.

Servicing and maintenance of refrigerators, window airconditioners and water coolers are also a part of the additional task of this department. Over the years, quite a large number of damaged furniture like steel cots, almirahs, trollies, steel table

frames, lockers, screens, stands, chairs were repaired.

BP apparatus, laryngoscope, ophthalmoscope, stethoscope and diathermy units, respiratory ventilators, radiological equipments are being maintained to help improve the patient care.

MANPOWER DEVELOPMENT

The Instrumentation laboratory offers short term practical training course on design, development and maintenance aspects of medical instrumentation to various engineering college students.

FABRICATIONS & MODIFICATION

About 400 spring cots of psychiatric wards have been modified into sheet cots to safeguard the cushion mattresses. All the stretcher trollies were modified into a more convenient trolly with cycle wheels and very high quality, roadworthy castor wheels for easy movements.

Almost all the cots in the neuro wards were fitted with new type of wheels to move the patients from ward to operation theatre, radiology department etc. Now, they are trouble-free and most convenient.

Engineering Section

The engineering and maintenance activities of the erstwhile Mental Hospital and AIIMH were looked after by Karnataka Public Works Department and Central Public Works Department respectively. After the integration of the Mental Hospital and AIIMH and formation of NIMHANS, a separate engineering section was opened. All the construction works are undertaken under the supervision of the Building and Works Committee headed by the Chief Engineer (Construction & Buildings) of the Government of Karnataka. With several buildings added in recent years, and many others coming up, the institute's campus is growing in length and breadth.

For the last ten years, several important buildings have come up. During 1980, the first floor over the occupational therapy and rehabilitation (OCTD) building, one nurses hostel and a building to accommodate laundry services were constructed. The first floor over the men's hostel was built in 1983.

In order to cater to the needs of the increasing out-patients, a separate neuro-psychiatric out-patient building at a cost of 83 lakhs in under final stage of completion. This modern building spreads over an area of 14 acres. The need for additional psychiatric special wards were felt and accordingly two-floor psychiatric special wards building with a bed strength of 70 was completed during 1985.

Establishment of several new departments necessitated additional space requirements. In order to provide adequate space to the departments of biophysics, biostatistics a id to house the departments of cytogenetics, psychopharmacology and neurovirology, the second floor over the administrative block was built.

Efforts to provide residential quarters to as many staff as possible are made. Apart from the quarters built in the previous years, 4 nos. of type I, 10 nos. of type III and IV and 8 nos. of type V quarters were constructed during the period. Residential accommodation is also being provided in the newly allotted lands near Byrasandra.

WORK IN PROGRESS

An extension of the OCTD building is nearing completion. Construction of second floor over the special wards in the Neuro Centre and a 0.2 MG overhead water tank is in progress. The work of providing sound proof facility to the ENMG laboratory is nearing completion. Another 92 quarters are under construction.

FUTURE PLANS

Construction of the new library and information services block, an auditorium, common laboratory in the administrative block, mortuary building and ladies hostel are being undertaken.

Ayurvedic Research

The Ayurvedic Research Unit of the Central Council for Research in Ayurveda and Siddha, has been functioning at NIMHANS since 1971 with the Director of NIMHANS as its Project Officer. This unit is manned by ayurvedic physicians, psychiatrist, clinical psychologist, statistician and other paramedical and ministerial staff. It is engaged in understanding and examining the role of ayurvedic system in treating different *manasa vikara* (psychiatric illnessess). In pursuance of this goal, the Unit has been conducting studies on various aspects of *manasa vikara* on the basis of their descriptions in the ayurvedic classics. Recently the Unit has also taken up studies on certain neurological disorders.

MANPOWER DEVELOPMENT

Lectures are being delivered on different aspects of 'Manasa roga (mental disorders) described in Ayurveda' and on the activities of this unit to the house surgeons deputed from the Govt. Colleges of Indian Medicine in Karnataka, students of the Nursing College, Bangalore, and foreign scholars and visitors from time to time. Periodical orientation lectures are delivered for the benefit of faculty members and residents.

SERVICES

Besides the studies pursued, the Unit offers general clinical services to the patients suffering from different mental disorders who opt for ayurvedic treatment. In addition to regular out patient service, in patients with 40 beds are available. The clinical services are also provided to the staff of the Unit and the NIMHANS.

STUDIES

Brahmyadiyoga

A double blind controlled study of Brahmyadiyoga and Tagara in the management of acute schizophrenia (various types of unmada) has been done during 1973-74. Brahmyadiyoga is a herbal compound containing Brahmi *(Centella asiatica)*, Vacha *(Acorus calamus)*, Jatamamsi *(Nardostachys Jatamamsi)*, Kustha *(Saussurea lappa)*, Sarpagandha *(Rauwolfia serpentina)* and Tagara *(Nymphoides macrospermum)*. The effect of this compound and the single drug Tagara, were compared with that of Chlorpromazine and a Placebo. Twenty-seven patients were studied under each group.

It was found that Brahmyadiyoga was significantly better than Placebo and Tagara in reducing morbidity. Tagara was not very effective. Chlorpromazine was significantly better than Placebo and Tagara. Although it was superior to Brahmyadiyoga, the difference was not statistically significant.

Ksheerabala Taila

A controlled study on the role of Ksheera bala taila in psychogenic headache *(Vataja shirahshoola)* was carried out during 1973-77. Fifty-six patients (28 in Ksheerabala taila group and 28 in placebo group) suffering from psychogenic headache were studied. Ksheerabala taila was used in 28 cases in the form of *pana* (oral consumption) *nasya* (nasal instillation) and *shiroabhyanga* (anneling on head), for six weeks.

During the period of treatment, the Kshee rabala taila treated troup registered impro-

vement more than the placebo treated group. There was also significant reduction in the anxiety syndrome in the ksheerabala treated group but no significant difference was noticeable in depression syndrome.

Unmada

A preliminary study on *laxanasamucchaya* (symptomatology) of *unmada* (psychosis) was done in 1975. In this study, an attempt was made to understand the possibility of diagnosing *unmada* on the basis of *lakshana* and *doshadusti* (dosic imbalance) and the psychiatric diagnosis of mental disorders.

One hundred cases of *unmada* were studied. There was a high agreement between the two ayurvedic physicians both on diagnosis and symptoms. But there was no correlation between ayurvedic and psychiatric diagnosis.

Shirolepa

A pilot study on *Shirolepa* (head plaster) in psychotic excitements was conducted in 1975. A herbomineral compound powder containing powers of *Amalcki (Embalica officinalis)* deseeded dry fruit, *Sarpagandha (Rauwolfia serpentina)* root, *Khaskhas (Papivera somniferum)* dry seeds and *Gärika* (red orchre) mineral, was used in the form of a paste (made with rose water, which served as a binding agent) for applying on the vertex in patients suffering from various kinds of psychotic excitements. The thickness of each application was for 0.5 cm. Five applications were made per day on the average. The change was observable in 20 to 40 minutes after application.

Out of 231 applications, 141 brought about calming effect and it was observed that this application was effective in bringing down moderate degree of excitement in psychotics.

Anavonmada

A pilot study on the role of Brahmyadiyoga in chronic schizophrenia (*anavonmada*) was done between 1975-76. Brahmyadiyoga a herbal compound formulated by the Unit was orally administered in the form of tablets in doses 6, 12 and 16 gm in the first, second and third months respectively for a period 3 months. Of the 14 selected, only 10 took treatment for more than 3 months and of them, 7 improved. The other four who took treatment only for two months also improved

A double blind controlled study on the role of Brahmyadiyoga in *anavonmada* was made in 1979-82.

In this, 65 chronic patients suffering from schizophrenia were studied. Of them 23 belonged to Brahmayadiyoga (BRY) group, 22 to Chlorpromazine (CPZ) group and 20 to Placebo (PLB) group. The drug administered to each patient was 75 days.

The study revealed that BRY is better than PLB although CPZ was significantly better than both BRY and PLB. It was concluded that BRY could be considered as fairly dependable ayurvedic drug for a general ayurvedic practitioner.

Ksheeradhara

Ksheeradhara in anxiety neurosis (*chittodvega*) – a pilot study was conducted during 1976-78. Ksheeradhara is a treatment given by streaming medicated milk obtained by boiling the milk with certain herbal decoctions on the forehead of the patient, daily for 14 days.

This was administered to 10 patients who suffered from anxiety neurosis for more than six months and did not respond to allopathic treatment of at least 3 months duration. Their periodical assessments were made by ayurvedic physician, psychiatrist and clinical psychologist. Of the 10 patients 8 improved,

and the improvement was statistically highly significant.

Ayurvedic Treatment in Unmada

A retrospective study on the general line of ayurvedic treatment in *unmada* (psychosis) was conducted during 1977. Under this study, 182 cases treated with general line of ayurvedic treatment from 1972 to 1976 were reviewed. They had been given both *dosphapratyaneeka* (anti-doshic) and *vyadhipratyaneeka* (anti-disease), medicines depending on their conditions. Supportive treatments like *virechana* (purgation), *abhyanga* (anneling), *basti* (enema), *nasya* (nasal instillation), *shirolepa* (headplaster) etc. and drugless measures like *bhajana* (prayer), *chankramana* (strolling), *kreeda* (play) were administered wherever possible and necessary.

Of the 182 cases 15 showed much improvement, 99 showed improvement, 47 showed slight improvement and others either did not improve or left against medical advice.

The findings proved that the general line of treatment is significantly effective in the management of various types of *unmada*. It was observed that 66% of the patients happened to be cases of *dwandwaja unmada* which is not described in the texts.

Mental Examination

An approach to mental examination based on ayurvedic concepts was done during 1978-79. A modified scheme of mental examination based on the definition of *unmada* by Charaka and the descriptions available in the chapters on *dinacharya* (daily regimen), *ritucharya* (seasonal regimen) and *sadvritta* (code of virtues) has been prepared and published in the form of monograph.

This is found very useful in the study of various *manasavikara* on ayurvedic lines and is expected to be of immense use to the ayurvedic scholars, researchers and general practitioners in the understanding and management of different mental disorders.

Abhinyasajwara

Under the priority programmes, a service cum research project on Japanese Encephalitis was taken up in collaboration with the Regional Research Centre (CCRAS), Bangalore, in November – December, 1979. An initial camp for 3 weeks and later fortnightly services were carried out at Chintamani, Kolar District.

Fiftyone encephalitis striken children have been treated by the team. Of them, seventeen recovered completely and thirty-two improved with residual deficits. Two cases died during treatment in the acute phase of the illness. Eight of these children exhibited psychiatric symptoms. Visual and auditory hallucinations, mutism and extreme fear were predominant symptoms during the acute phase. In the residual phase truancy, stubbornness and decreased learning ability were observed.

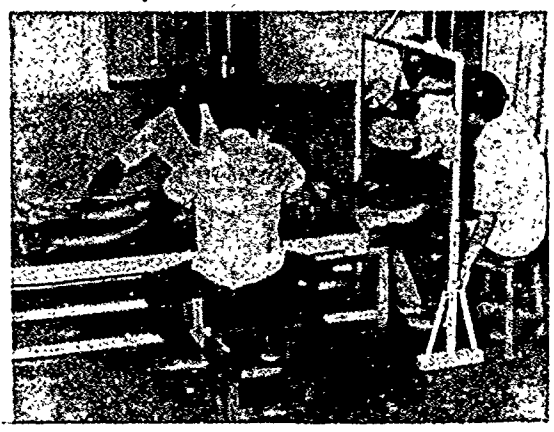
Five of these eight have recovered completely and the remaining showed marked improvement when seen six months after the onset of the illness, following therapy with ayurvedic drugs comprising of certain herbal as well as herbomineral preparations administered both internally and externally.

Studies in progress

1. Role of certain ayurvedic drugs in uncontrolled epilepsy *(apasmara)*.
2. Role of Ayushman-8, a herbal compound in mental retardation.
3. Further studies on lakshana samucchaya of *unmada*.
4. Role of certain ayurvedic herbs in Parkinson's disease *(kampavata)*.

5. Role of certain ayurvedic drugs in the management of anxiety neurosis *(chittodvega).*
6. Role of ayurvedic treatment in the acutely ill patients with schiophrenia *(unmada).*
7. Pilot study on the role of certain ayurvedic drugs in the management of major depression DSM III *(vishada).*

Bhashpasweda (steam sedation)



Shirodhara (steaming medicinal fluids on the head.

FACULTY MEMBERS

Dr. G. N. Narayana Reddy, Director and Professor of Neurosurgery
Dr. R. M. Varma, Emeritus Professor of Neurosurgery

Department of Psychiatry

Dr. S. M. Channabasavanna	Professor and Head of the Dept. of Psychiatry and Medical Superintendent
Dr. H. S. Narayanan	Associate Professor
Dr. P. S. Gopinath	Associate Professor
Dr. R. Srinivasa Murthy	Associate Professor
Dr. C. Shamsundar	Associate Professor
Dr. K. N. Srinivas	Assistant Professor
Dr. N. Janakiramaiah	Assistant Professor
Dr. Mohan K. Isaac	Assistant Professor
Dr. Rajat Ray	Assistant Professor
Dr. Ravishankar Pandey	Assistant Professor
Dr. V. Shivaprakash	Assistant Professor
Dr. C. R. Chandrashekar	Assistant Professor
Dr. Satischandra Girimaji	Lecturer
Dr. S. K. Chaturvedi	Lecturer
Dr. Nimesh G. Desai	Lecturer
Dr. Shoba Srinath	Lecturer
Dr. B. N. Gangadhar	Lecturer
Dr. R. Raghuram	Lecturer
Dr. Somanath Chatterjee	Lecturer

Department of Neurology

Dr. M. Gourie Devi	Professor and Head of the Department
Dr. H. Sathyanarayana Swamy	Associate Professor
Dr. D. Nagaraja	Assistant Professor
Dr. P. Satish Chandra	Assistant Professor
Dr. Suresh Rao Aroor	Lecturer in Paediatric Neurology
Dr. Arun Kumar B. Taly	Lecturer

Department of Neurosurgery

Dr. Bhabani Shankar Das	Professor and Head of the Department
Dr. V. K. Jain	Assistant Professor
Dr. A. S. Hegde	Assistant Professor
Dr. K. S. Narayana Swamy	Lecturer
Dr. B. A. Chandramouli	Lecturer

Department of Neuropathology

Dr. Sarala Das	Professor and Head of the Department
Dr. S. K. Shankar	Associate Professor
Dr. T. Vasudeva Rao	Lecturer

Department of Microbiology

Dr. A. Chandramuki	Associate Professor and Head of the Department
Dr. B. N. Gokul	Assistant Professor

Department of Neuroanaesthesia

Dr. G. Parameshwara	Associate Professor and Head of the Department
Dr. R. Ramani	Assistant Professor
Dr. G. S. Uma Maheshwara Rao	Lecturer

Department of Neuro Radiology

Dr. B. Y. T. Arya	Associate Professor and Head of the Department
Dr. P. N. Jayakumar	Lecturer

Department of Neurophysiology

Dr. T. Desiraju	Professor and Head of the Department
Dr. B. L. Meti	Lecturer

Department of Clinical Psychology

Dr. G. G. Prabhu	Professor and Head of the Department
Dr. K. Sathyavathi	Associate Professor
Dr. (Mrs) Malavika Kapur	Associate Professor
Sri. P. Madhu Rao	Assistant Professor
Dr. V. Kumaraiah	Assistant Professor
Dr. C. R. Mukundan	Assistant Professor
Dr. Haripada Mishra	Assistant Professor
Dr. S. V. Nagalakshmi	Lecturer
Sri P. Kodandaram	Lecturer
Sri S. Ramachandra	Lecturer
Mr. Craig Joseph Gonsalvez	Lecturer
Ms. Kiran Rao	Lecturer
Ms. Nomita Verma	Lecturer
Dr. (Mrs) Shobini Lalith Kumar Rao	Lecturer
Dr. J. P. Bal[illegible]dhi	Assistant Professor, Indian Philosophy and Sanskrit
Dr. Satwanth Pasricha	Lecturer in Clinical Parapsychology

Department of Psychiatric Social Work

Dr. I. A. Sheriff	Professor and Head of the Department
Dr. R. S. Bhatti	Assistant Professor
Dr. V. Nageswara Rao	Lecturer
Sri M. Ahmed Beig	Lecturer
Sri R. Parthasarathi	Lecturer
Sri M. Ranganathan	Lecturer
Dr. G. Nardev	Lecturer

Department of Neurochemistry

Dr. B. S. Sridhara Rama Rao	Professor and Head of the Department
Dr. K. Tharanath Shetty	Associate Professor
Dr. M. N. Subhash	Assistant Professor
Dr. G. Y. C. V. Subbalakshmi	Lecturer

Department of Biostatistics

Sri V. G. Kaliaperumal	Associate Professor and Head of the Department
Sri D. K. Subbakrishna	Assistant Professor
Dr. Sanjeev Balwant Sarmukaddam	Lecturer
Sri M. Venkataswamy Reddy	Lecturer

Department of Biophysics

Dr. Viney Kumar Jain	Professor and Head of the Department
Dr. K. Bhaumik	Assistant Professor

Department of Speech, Hearing and Language

Sri. M. N. Nagaraj	Lecturer and I/C Head of the Department

Department of Psychiatric Nursing	
Smt. K. Reddemma	Assistant Professor and Chief Nursing Officer I/C
Sri I. V. H. George	Lecturer
Smt. K. Lalitha	Lecturer
Sri H. M. Gangadharaiah	Lecturer
Department of Psychopharmacology	
Dr. N. Pradhan	Associate Professor
Dr. Chandrashekar K. Mayanil	Lecturer
Department of Neuro Virology	
Dr. V. Ravi	Lecturer
Department of Physical Medicine and Rehabilitation Services	
Dr. P. S. Gopinath	Associate Professor of Psychiatry and I/C Head of the Department
Dr. B. S. Padankatti	Associate Professor
Dr. Y. Ram Mohan	Senior Research Officer, Electron Microscopy
Dr. J. Suresh Chandra	Veterinarian
Sri G. Lakshmanna	Biomedical Engineer
Sri N. Gopalakrishna	Assistant Editor
Sri H. S. Siddamallaiah	Senior Librarian
Administrative Staff	
Sri M. S. Vasudeva Murthy	Administrative Officer
Sri T. A. Srinivasan	Accounts Officer
Sri M. N. Rukmasa	Asst. Administrative Officer (H)
Sri Y. S. Keshava Murthy	Asst. Administrative Officer (A)
Sri C. Radha Krishna	Asst. Administrative Officer (S)
Engineering Department	
Sri H. K. Rangaswamy	Asst. Executive Engineer
Sri S. M. Parameswaraiah	Asst. Engineer (Electrical)
Sri D. Harishkumar	Asst. Engineer (Civil)
Honorary Consultants	
Dr. T. B. Basavarajendra	Hon. Consultant in Medicine and Chairman, Medical Board, NIMHANS
Dr. K. R. Murthy	Hon. Consultant in Ophthalmology and Member, Medical Board, NIMHANS
Dr. C. Vittal	Hon. Consultant in Surgery and Member, Medical Board, NIMHANS
Dr. V. Hemalatha	Hon. Consultant in Paediatric Surgery
Dr. D. G. Benakappa	Hon. Consultant in Paediatrics
Dr. A. Mahadevaiah	Hon. Consultant in E.N.T.
Dr. C. Madaiah	Hon. Consultant in Thoracic Surgery
Dr. H. K. Srinivasa Murthy	Hon. Consultant in Orthopaedics Surgery
Ayurvedic Research Unit (CCRAS)	
Dr. M. G. Ramu	Asst. Director (Ayurveda)
Dr. B. S. Venkataram	Research Officer (Ayurveda)
Mrs. Hemalatha Mukundan	Asst. Research Officer (Clinical Psychology)

Statewise Distribution of Trainees

Courses	A.P.	Assam	Bihar	Central	Delhi	Gujarath	Kerala	Karnataka	Tamilnadu	Maharashtra	M.P.	Orissa	Punjab	Others	Rajasthan	U.P.	W.B.	J & K	Burma	Nepal	Sri Lanka	Haryana	Somali	*Total*
M.D. Degree in Psychological Medicine	9	–	–	–	2	–	12	23	10	1	–	1	–	2	1	1	2	–	–	–	–	–	–	64
D.M. Degree in Neurology	–	–	–	–	1	–	2	7	1	2	1	–	–	–	1	–	–	–	–	–	–	–	–	15
M.Ch. Degree in Neurosurgery	5	–	–	–	–	–	1	4	2	1	–	–	1	–	–	2	–	–	–	–	–	–	–	16
Diploma in Psychological Madicine	24	–	–	1	1	–	21	47	16	7	2	2	1	1	5	3	–	3	–	1	–	3	–	138
Ph.D. in Clinical Pschology/M.H. & N.S.	–	–	–	–	–	–	3	3	–	–	–	1	1	4	–	1	1	–	–	–	–	–	–	14
M. Phil in Medical & Social Psychology	6	–	1	–	5	–	20	31	17	2	5	2	5	1	3	7	–	1	–	–	–	2	–	108
M. Phil in Psychiatric Social Work	7	–	–	–	–	–	9	27	20	2	–	–	–	2	–	1	–	–	–	–	–	–	–	68
M.Phil in Neuro-Physiology	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	3
Diploma in Psychiatric Nursing	8	2	3	7	2	2	25	104	4	9	3	3	8	11	–	–	2	–	–	2	–	–	4	199
Diploma in Neuro Nursing	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2
Total	59	2	4	8	11	2	95	248	70	24	11	9	16	21	10	15	6	4	–	3	–	5	4	627

MEMORIAL PRIZES AWARDED

D. L. N. Murthy Rao Prize
DPM

Name of the Student	*State*	*Year*
1. Dr. Mohan K. Isaac	Karnataka	1975
2. Dr. C. R. Chandrashekar	Karnataka	1976
3. Dr. R. Raghuram	Tamil Nadu	1977
4. Dr. Shoba Annaiah	Karnataka	1979
5. Dr. K. Chandrashekar	Andhra Pradesh	1980
6. Dr. P. S. V. N. Sharma	Andhra Pradesh	1981
7. Dr. Uthpal Gowswami	West Bengal	1982
8. Dr. Shekar Pennathur Sheshadri	Tamil Nadu	1983
9. Dr. Sumanth Khanna	New Delhi	1984

M. V. Govindaswamy & D. L. N. Murthy Rao Memorial Prize
DPN

Name of the Student	*State*	*Year*
1. Sri P. K. G. Nambiar	Karnataka	1975
2. Smt. S. Janaki Shyamala	Karnataka	1976
3. Sri Nagarajaiah	Karnataka	1978
4. Miss T. P. Prema	Andhra Pradesh	1979
5. Capt. Miss. Harjeet	Punjab	1980
6. Mr. Rachel Irwin	Karnataka	1981
7. Mr. E. Umapathiah	Karnataka	1982
8. Mr. Ramachandra	Karnataka	1983
9. Sister Juliana	Kerala	1984

M. V. Govinda Swamy Memorial Prize
DM&SP and M.PHIL. IN M&SP

Name of the Student	*State*	*Year*	*Course*
1. Ms. Farida Abdulla	Jammu & Kashmir	1975	DM&SP
2. Smt. N. Sumathi	Karnataka	1976	DM&SP
3. Smt. Shakila Rani Shetty	Karnataka	1977	DM&SP
4. Ms. Shobana Sonpar	Andhra Pradesh	1979	MM&SP
5. Ms. K. Shailaja Kumari	Andhra Pradesh	1980	MM&SP
6. Ms. D. Sujatha	Tamil Nadu	1981	M.Phil in M&SP
7. Ms. Nomita Verma	Tamil Nadu	1982	M.Phil in M&SP
8. Mr. Craig Joseph Gonsalvez	Tamil Nadu	1983	M.Phil in M&SP
9. Ms. Elizabeth Daniel	Karnataka	1984	M.Phil in M&SP

M. V. Govinda Swamy Memorial Prize

Name of the Student	*State*	*Year*	*Course*
1. Ms. Shaila V. Pai	Karnataka	1975	D.P.S.W.
2. Mr. Gomez Keith Conrad Linus	Tamil Nadu	1976	D.P.S.W.
3. Mr. R. Parthasarathi	Tamil Nadu	1977	D.P.S.W.
4. Ms. Antony Lilly Pushpam	Tamil Nadu	1979	M.P.S.W.
5. Ms. Leontine M. P. Rasquinha	Karnataka	1980	M.Phil in PSW
6. Mr. T.S. Chandrashekara	Karnataka	1981	M.Phil in PSW
7. Ms. Vimala Uttarkar Viswanatha Rao	Karnataka	1982	M.Phil in PSW
8. Smt. R. Sandhya	Karnataka	1983	M.Phil in PSW
9. Ms. Martins Joaozinha D. A. Sagrada Familia Antonio	Goa	1984	M.Phil in PSW

Name of the Student	*State*	*Year*	*Course*
1. Dr. Somnath Chatterji	Bihar	1982	M.D. Psychiatry
2. Dr. K. Srinivasan	New Delhi	1983	M.D. Psychiatry
3. Dr. Avadesh Kumar Sharma	Uttar Pradesh	1984	M.D. Psychiatry
4. Dr. R. Pratap Chand	Kerala	1982	D.M. Neurology
5. Dr. Arun Kumar B. Taly	Rajasthan	1983	D.M. Neurology
6. Dr. Maya Gantayat	Orissa	1984	D.M. Neurology
7. Dr. K. S. Narayana Swamy	Karnataka	1982	M.Ch. Neurosurgery
8. Dr. B. A. Chandramouli	Karnataka	1983	M.Ch. Neurosurgery

World Health Organisation (WHO)
Fellows trained at NIMHANS

1.	Afghanisthan	3
2.	Bangladesh	18
3.	Burma	1
4.	Democratic Yemen	3
5.	Indonesia	12
6.	Nepal	3
7.	Somalia	4
8.	Srilanka	8
9.	Other (WHO Consultant)	1

Seminars/Symposia/Conference/Refresher Courses held at NIMHANS

1975

National seminar on epilepsy.

1977

Third conference of Indian Society of Psychiatric Social Work.

First refresher course in behaviour therapy and biofeedback.

National symposium on biological membranes and model systems.

1978

National seminar on psychotherapeutic processes.

1979

Joint conference of national organisations of psychiatry, neurology, clinical psychology and psychiatric social work.

29th annual conference of the Neurological Society of India.

National workshop on postgraduate training in psychiatry.

National workshop on curriculum development in psychiatric social work.

WHO workshop on postgraduate training in psychology.

National seminar on neuro-oncology.

1980

National workshop on recent advances in leprosy research.

National seminar on health science libraries.

1981

International workshop on new techniques in neurosciences with special references to the neurophysiology of higher nervous activity.

National workshop on rehabilitation of mentally disabled.

Seminar on inborn errors of metabolism in children in India and problem of mental retardation.

1982

Seminar on neurovirology.

Symposium on yoga, brain and consciousness.

National seminar on paediatric neurosurgery.

Workshop on mental hospital administration.

Symposium on how to add life to years.

Second refresher course in behaviour therapy and biofeed back.

Third refresher course in behaviour therapy and biofeedback.

1983

First national seminar on neuroanaesthesia.

Symposium on recent advances in understanding the synaptic organisation and control mechanisms of motor-sensory system.

Symposium on mind, brain and consciousness.

National workshop on techniques and applications of computer analysis of the human EEG and brain stem far-field evoked potential.

First national workshop on family therapy.

Excerpta medica user education seminar.

Fourth refresher course in behaviour therapy and biofeedback.

Symposium cum workshop on central auditory disorder.

NIMHANS – ADAMHA symposium.

1984

International symposium on motor neurone disease.

Workshop in metrizamide myelogram.

Workshop on experimental research approaches to study basic neurophysiological mechanisms of brain and behaviour.

International symposium on biological psychiatry with ADAMHA group.

WHO workshop for parents and teachers on self help groups.

Fifth refresher course in behaviour therapy and biofeedback.

A refresher course in recent advances in psychiatry for psychiatrists.

Annual conference of Indian Society of Criminology.

Symposium on current research trends and progress in understanding the physiology of brain and behaviour.

WHO workshop on national mental health programme.

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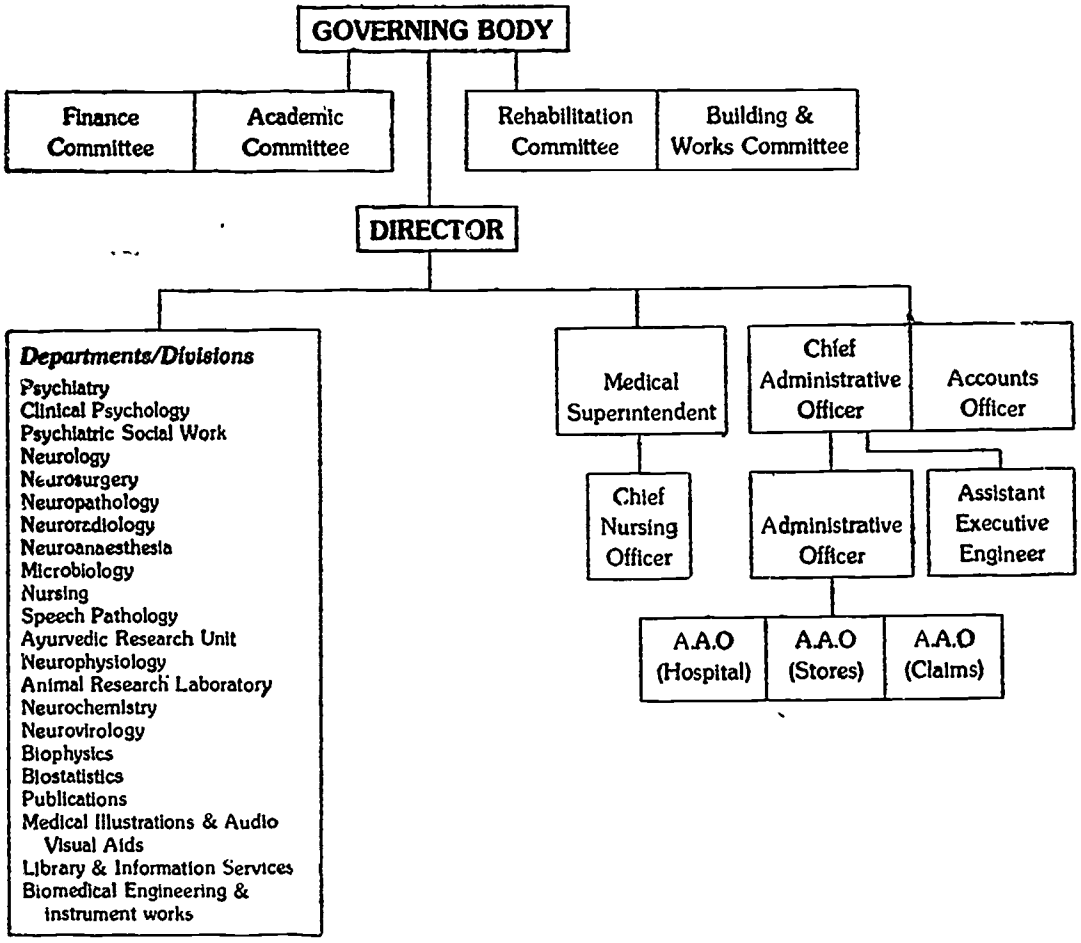

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