

bank-borrowers who are small industrialists, agricultural land-holders and the such who are getting very difficulty to survive unless liberal and adequate financial facilities are provided to them. Thus, the nationalisation of Commercial banks can be regarded as a mere transfer of ownership from different private capitalists to the state-monopolist, who on the otherhand, serve the capitalist means of production thus strengthening the financial base of the capitalist production and saving the weak and small capitalists in the economy from ruin. Thus, instead of promoting social welfare and welfare of the millions of poors, the fourteen nationalised banks in India would strengthen the root of capitalist expansion. It is because of the capitalist crisis of the day and the mobilisation of grievances by the oppressed people that some sort of socialist instruments are being utilised by the capitalist state as a saviour of the system and to convince the people through a false levelling of socialism and social welfare that socialism can be attained living within capitalism and which is scientifically not possible. So, can a capitalist claim to be a socialist? It is certainly not. If a country is to reach the goal of socialism, it must be by a complete and total revolutionary change overthrowing capitalism by socialism. Then only all the socialisation becomes possible and fruitful. Otherwise, socialism cannot be attained by plastering the ills of capitalism with the socialistic touch. The nationalised commercial banks under the capitalist structure of the Indian economy will serve, in this way or that

way, the existing productive and economic system. It is to be of no use to say that the nationalised banks will increase the efficiency of the bank-workers. On the otherhand, the state-power will be much more stronger to suppress the legitimate movements of the bank-employees. Thus, the hope presented before the people—to the industrial workers, land-less peasants, low-wage earners and the millions of poors, sufferers & oppressed, to the Marxists and intellectuals—will turn to be a false one. One can only say that by the governmental ownership of banks some of objectives of the government will be fulfilled. Thus, the nationalisation of the fourteen banks is mainly for the interest of the ruling class in the context of its plan-policy, investment policy, credit policy, policy of production and income distribution and not for the interest of the mass people. So, how it can lead a step to socialism?

The nationalisation of commercial banks even may stand against, for some time, the socialist revolution. It cannot be a step towards socialism. It is the inherent urge of the existing system of means of production to mobilise the financial institutions by nationalisation to strengthen the system itself for the purpose of greater need of state-monopolist and prolonging the lives of small and medium capitalists in one hand and to injure the revolutionary spirit among the mass people on the other. Thus, it is very difficult for one to think in this line that nationalisation of commercial banks can be a step towards socialism in India.

9-8-7-6-5-4-3-2-1. Fire!

Ahmed Eusuff Zaheer
2nd Yr. B.Sc. (Hons)

Despoiled by the footsteps of man, the moon can never be the same again. The golden disc may appear and disappear in the distant blue sky as though man's approach has made no difference to it, but it has lost for ever its grand role as an inspirer of legends.

Poets may still extol it as a symbol of love, beauty and tenderness, but the flight of fancy evoked by the everchanging tenderness will never occur again. Its purity has been spoiled by the Apollo-11 mission, which fulfilled man's dream of landing a man on moon.

On July 21, 1969, many people on earth watched on television, Mission Commander astronaut Neil Armstrong setting his left foot on the moon's surface, thus becoming the first man to tread on a celestial body. On setting foot on the moon, Commander Armstrong told millions on earth watching him that that stride is "One small step of man one giant leap for mankind."

Minutes earlier, he had opened the hatch of the lunar module, "Eagle", perched on the moon's surface and climbed down two steps on the ladder. There he stopped to switch on a television camera so that the rest of mankind could witness the historic moment to come. Then facing the ladder, he reached the last-rung. He paused, extended one leg down to probe the moon's surface. He felt the ground at several places to make sure all were well



and then jumped down thus making his name glitter in the history as the first man to set foot on moon. The day the first aircraft made its maiden flight in the air was some half a century ago. Man could have very well rested on his laurels thus winning his race into space, but his nature being what it is, he refuses to set a limit to his ambition and one success. Man has conquered the moon and now he has set for himself an amazing target and that is to reach the planets round the sun. The first objective was the moon which has been achieved by the three American astronauts on July 1969. The next objective is the conquest of the planet Mars.

Many developed countries are trying to send man to the moon. But only two countries have been able to send rockets and satellites from earth into space on a large scale. They are U. S. A. and U. S. S. R. The main object of spaceflight is to make the interplanetary travel a reality and make human beings reside on the planets. By doing so, it will lessen the population on earth which swells so rapidly that the earth could no longer bear it.

Before the Apollo-11 mission was undertaken many intensive tests were carried out by other Apollo missions, so as to check out any difficulty that might crop up. These rehearsals were carried out by the Apollo-7, Apollo-8, Apollo-9 and Apollo-10 missions. The Apollo-10 missions, as a final dress-rehearsal for a planned manned moon landing mission, orbited round the moon for 31 times. The crucial moments of the 8-day mission came when astronauts Thomas. P. Stafford and Eugene. A. Cernan detached themselves from the main spacecraft and descended lower to within about 9 miles of moon while Astronaut John. W. Young controlled the main craft. The success of this mission opened the way for

moon-landing attempt by the Apollo-11 mission.

The Apollo-11 space craft consisted of the Command Module, Service Module, Lunar Module and the Emergency Escape System. The command module was situated at the nose of the spacecraft. It was a cone shaped module. The lunar Module was at the tail-end of the space-craft. This mini space-craft has two stages—the descent and the ascent. The service module was in the middle section having provisions for mid-course corrections. The function of the emergency escape system is to project the section containing the astronaut clear out of the launch, if any thing goes wrong.

America's landing man on moon on the Apollo-11 mission started on the 16th July '69 at 6-30 P.M. (I.S.T.) from Kennedy Space Centre, Florida. The three Americans roared away from the earth in a giant sized "Saturn V" booster. The three stages of the booster fired on schedule during 11 minutes 58 seconds of powered flight and drilled Apollo-11 into the earth's orbit. The rocket and the Spacecraft was 365 feet tall on a launch pad.

For three days, the astronauts soared outward on a quarter-million miles voyage through space with a decrease in velocity as the rocket was soaring nearer to the gravitational pull of the earth and then fastly picking up speed again. At about 22:56 hours (I.S.T.) the Command Module arrived near the moon and injected itself into the moon's orbit.

Mission Commander Armstrong and Lunar Module pilot Edwin Aldrin crawled through the tunnel connecting the mother ship, "Columbia", and the Lunar Module "Eagle", and got into the lunar module which would

carry them on to the moon's surface. The lunar module was detached from the mother-ship Columbia, while Collins kept his lonely vigil in Columbia patrolling the moon in an orbit between 6 and 7.5 miles above, standing to take them off.

The module made a soft landing on the moon's surface at 0147 hours (I.S.T.) on 21st July '69 in the Sea of Tranquility. The lunar module landed approximately 100 kilometers east of Crater Sabine and about 190 kilometers South-west of Crater Maskelyne and the time taken between the run off from Cape Kennedy and the landing of the Eagle on the moon's surface i.e. on the Sea of Tranquility, totalled exactly 102 hours 45 minutes and 45 seconds. At the moment of landing there was a dust of cloud due to the module's engine.

The Sea of Tranquility, where the module landed, was seen on the television screen as nearly flat with small round craters. Small egg-shaped stones were seen strewn all around.

The lift-off from the moon came 21 hours 36 minutes 41 seconds after the landing on the moon during which for over two hours Armstrong and Aldrin walked jerkily and leaped exuberantly on the surface of the planet, picked up powdery and purple rocks from the surface, fulfilled all other tasks assigned and left man's first foot prints on the moon.

During the day's stay on the surface of the moon, Armstrong, who landed on the moon's surface at first in a bulky suit that gave him the life-sustaining environment of this planet, was joined, after 20 minutes, by Aldrin, his companion on this track of history.

Soon they began exploring the lunar surface. While they began to descend, their heart-beat was varying in a large range till nearly the normal mark was reached within 3/4th of an hour. The sun appeared to alter the colours around them. Aldrin said, "Almost every variety of rock you could find. The colour varies, depending on how you are looking at it. Doesn't appear to be much of a general colour at all".

While exploring together they unveiled a plaque and planted the American stars and stripes. The plaque said simply : "Here men from the planet earth first set foot on the moon, July 1969, A.D. We came in peace for all mankind."

With no breeze to keep it flying, the flag had a stiffener along its top edge to keep it unfurled. Then, as the astronauts scoured the moon's surface, the secrets of another world came tumbling out.

The lunar vehicle "Eagle", the first manned craft to touch down outside earth, claimed the distinction of being also the first to blast out of a celestial body when it lifted from the moon at 23.23.hrs. I.S.T.

They went, they saw and now they are back to earth. In a day's stay on the hitherto much-catered dusty untrodden lunar surface, they bought rocks and other mementoes from the lunar surface to the earth.

After its lift-off from moon, the jolting burst of power of their space-craft's engine increased its speed from 5,000 km an hour to 99,100 km, enough to break the bonds of lunar gravity and send them on a great arc towards the anxious earth. Behind them, they left the historic little fract named

"Eagle", that carried them to the surface of the moon.

It was left in the lonely orbit around the moon, eventually to crash into its craggy surface and for further boosting the two explorers to a crucial link-up with the mother ship piloted by Collins.

The Apollo-11 space craft made a pin-point splash-down on the Pacific at 22-19 hours. I.S.T. on 24th July' 69. The time taken for splash-down after its take-off from Cape Kennedy on 16th July was exactly 195 hours and 18 minutes.

After their trail-blazing journey to the moon they were taken aboard the Ship-HORNET and were kept in a quarantine chamber as a precaution against any infectious organism which might have hitch-hiked to earth with them.

The astronauts were received with joy, relief and congratulations but none could shake hands with them. Also in the quarantine chamber were samples of lunar soil and rock, collected by Armstrong and Aldrin during their

exploration on the moon's surface and packed in the vacuum of the earth satellite.

Though we are proud of the Apollo-11 astronauts and speak highly of them, we must not forget those men who, working behind the screen, made the moon landing possible. The three men who made this moon landing possible are : Dr. John C. Houbolt, at present a senior Vice-President of the Aeronautical Research Association, who first proposed the idea, that a lunar landing vehicle descend from a mother-ship orbiting the moon as an alternative to direct flight or earth rendezvous. The other man is Dr. Werner von Braun, at present the Director of the Marshall Space Flight Centre in Houston and a driving force behind the moon programme. He was one of the German scientists working on the V-2 rocket that was transported to the U.S.A. in 1945 by American Intelligence officials. The third one is Dr. Charles Stark Draper, Director of Instrumentation Laboratory at the Massachusetts Institute of Technology, who devised the apollo telescopes, a sextant, a computerized inertial reference platform and other equipments.

Friendly Co-operation of Insects

Hrishikesh Das
3rd Year Science.

Insects are the largest number of animal beings found in this universe. Mayer, estimated about 850,000 species of insects. It is said that insects alone can have the contests with man. It is also said that if insects acquire the faculty of reasoning, such as is possessed by man, they would either exterminate man or reduce him to slavery. Even at present man has to fight intensively with insects which injure or destroy his fruits, grains, vegetables, fodder plants and forest trees--and what is more they carry diseases with them.

So, insects have established a partnership with human beings which has become definitely beneficial to man. From the following discussions we may come to the conclusion that there is a friendly co-operation between insects and human beings.

Sericulture :

Silk is known to all, but only a few people know whence it comes ? Cocoon, spun by the silkworm (*Bombyx mori*) for the protection of the

pupa of the insects, yields the true silk. Silk moths are cultivated in many countries of the world. The method of cultivating silkworms for the production of true silk is known as Sericulture. Pure silk was first manufactured probably in China at about 3,500 B.C. It was introduced into Europe in 552 A.D. To-day China and Japan are the only big producers of raw silk.

Sericulture is a source of unemployment solution. In India, this industry is a source of employment to 5 million people with an annual income amounting to Rs. 190,000,000.00. The total production of silk is about 2.5 million pounds. About 50 million pounds of silk are produced every year in the world. Sericulture has been a subject to intensive study in India since 1934.

Apiculture :

Bee-rearing or bee keeping is called apiculture. Honey is a very important product of the honey bees. Honey is not the actual nectar. Some chemical changes take place in the nectar of the flower when it is mixed with saliva. Sucrose is hydrolysed to Glucose, Levulose and Fructose, which are readily assimilated by man. This honey is stored in the cells with wax plugs. Honey is used by man as the main source of natural sweets for preparing Cakes, Bread and Caudies. It is a very important food for patients of Diabetes. The great food value of the honey can be estimated by the fact that 1 lb. of honey is equal to 4½ lb. of Grapes or 3 lbs. of Bananas, or 5 lb. Apples or 7 lb. Peaches, or 13 lb. Cauliflower or Cabbage. Honey is a very powerful tonic and it can be easily compared to 365-UG-VITAMIN B₁ (Thiamin); 268-U-VITAMIN-G (Riboflavin); 18 MG-VITA

MINE (Ascorbic acid); 254 **UG-PANTHOTHENID** acid or 0.60 **MG-NICOTONIC** acid. The chemical composition of one pound of honey is 6½ oz. **Levulose** (Fruitsugar), 5½ oz. **Dextrose** (Glucose), 9gms. **Sucrose**, 3 oz. **Moisture**, 7 gms. **Dextrines** and **Gums**, 1mg. of Fe, Ca, Na etc, and 4% of unknown substance.

Beeswax :

It is secreted from the glands found in the abdomen of the worker bees. Wax is removed from the bee-hive and is used as a base for an industry for the production of **Toilet-Goods** and **Cosmetics** like **Cold Creams**, **Shaving Creams**, **Candles**, **Polishes**, **Carbon papers**, **Electrical** and other products.

Lac-Culture :

Cultivation of lac insects (*Laccifera Lacca*) for the production of lac is called lac culture. Lac is the secretion from the back of those scale insects. Lac is used in the manufacture of **Grammophone records**, **Airplanes**, **Linoleum**, **Buttoms**, **Shoe-polishes**, **Pottery** and **Toys** etc.

Cochineal :

It is a beautiful carmine-red pigment of paints. It is obtained from scale insects. In these days cochineal is used as **Cosmetics** or **Rougs**, for decorating fancy **Cakes**, for **Colouring Beverages** and **Cough** and for **Neuralgin**.

Insects from the Medicinal Point of View :

In the 17th century almost every insect was believed to possess some medicinal power. This is a fact. A medicinal substance called **Cantharidin** is obtained from the dried

bodies of *Lytta vesicatoria*. Preparation known as "**Specific Medicine Apis**" is extracted from the bodies of honey bee and used for the treatment of **Liver**, **Diphtheria**, **Scarlet fever**, **Dropsy** and **Urinary irritation**. Homoeopathy also claims many medicines of insect-origin (**Cimex**, **Cantharis** etc.)

Pollinator :

Insects are considered to be of great value as pollinators. Many flowers are pollinated only by a specific type of insects. Insects which are parasitic or predators on other insect help man directly or indirectly by attacking or killing injurious species.

Insects in Arts :

Insects are also regarded to be a great source of inspiration, as they produce sweet sounds. Several poets have written about insects in their poems. In Japan, Cicadas and Crickets are placed in small cages and their songs are liked by many people there.

Insects as Food :

Insects provide abundant food supply for many animals such as Frogs, Lizard, Snakes, Fishes etc. Some animals live upon only insects like Moulds, Shrews and Ant-eater. Man also consumes many insects as their food. The Chinese prepare a sort of tea from cockroaches. The inhabitant of Amazan valley eat different Kinds of insects.

Value of Insects in the Advancement of Science :

Certain insects, like *Drosophila*, *Musca* etc. are indispensable in modern scientific research and have greatly contributed to our knowledge of **Genetics**, **Physiology**, **Cytology**, **Embryology** and **Ecology**.

“Statistics—its origin, development & scope.”

Kalyan Bhattacharjee
3rd yr. Science.

The science of Statistics that deals with the “Collection, presentation, analysis and interpretation of quantitative information”, despite its recent tremendous development, has an early history. In ancient times heads of different countries were interested in knowing the economic and social conditions of their countryman. For fixing up the taxation policy and administrative measures, they used to collect data necessary for the purpose. Long long years back, censuses of lands and population were taken by the ancient Hebrews, Chinese, Greeks, Egyptians, Romans and also by the Indians. Such collected data and censuses are found in Kautilya’s ‘Arthashastra’.

Previously, the term ‘Statistics’ was used to mean not only the quantitative informations but also the facts regarding the conditions of society. From the very beginning of twentieth century, the term ‘Statistics’ became associated with only quantitative informations. Truly speaking, the scientific statistics is of recent origin. In the medieval period, people had

mathematical discussions on lotteries and gamblings which gave useful materials to modern statistics.

The recent flourishing development of Statistics is mainly due to the valuable contributions of some great mathematicians to the subject. The eminent and celebrated mathematicians like Bernoulli, Gauss, Laplace and others in nineteenth and twentieth centuries have paved the way for modern statistics. The theory of probability that plays an important role in modern statistics, the method of least squares, the normal curve etc.—all owe their origin to the contributions of those mathematicians. In the twentieth century the original and outstanding works of two great statisticians have enriched the subject to a great extent. They are Karl Pearson and Ronald A. Fisher. The names of these two statisticians are solidly connected with the development of modern statistical theory. The contributions of the great Indian statistician like Prof. P. C. Mahalanabis, of whom everyone should feel proud, have also earned world-wide recognitions.

Statistics, as it stands now, is concerned with almost all spheres of human activity. In the present world, quantitative information is indispensable, and as such, statistics becomes an absolute necessity. The modern statistics is giving immense help to various subjects like Agriculture, Education, Public health, Industries, Employment, Trade-Union and labour, Trade and commerce, Relief and Rehabilitation, Railways, P&T, Censuses of populations and so on. Practically, the administrative machinery of a country must be dependent on quantitative informations that statistics can only give. Despite these, statistics has extended its helping hand to almost all the branches of science

subjects like Physics, Chemistry, Biology, Astronomy and so on. Various problems faced by the scientists and research scholars in their works can be solved with the help of statistics.

Statistics is thus "food of all Science, indispensable to research and intelligent Judgment."

In the present human endeavours, the help of statistics is absolutely necessary. It will be better here to cite an important saying of Prof. Mahalanabis on the matter—

"Statistics is essentially an applied science. Its only justification lies in the help it can give in solving a problem."



The Chromosomes of man

Prof. (Miss) Neena Chopra
Department of Zoology

Genetics, specially research in this particular field, is alive with excitement and revolutionary advances. Important to the development of science and evolution of social structure, genetics is widening its impact on many areas. The basic principles of genetics are few and simple and the studies in other organisms like *Drosophila*, Bacteria, Fungus etc, have laid the foundations for the interpretation of genetics of man. Mainly through a combination of studies in other organisms with those in man, human genetics has been able to make its greatest contributions to the science of genetics. The science of human heredity cannot however depend only on extrapolation from findings in other species but some aspects can be studied conclusively only in man. The example of sex determination in man, which is quite different from that in many other organisms, notably *Drosophila*, leads one to agree, although for different reasons, with Pope "The proper study of mankind is man".

Genetics is to biology what atomic theory is to physical sciences. Knowledge of human genetics or of any other organism starts with the study of the hereditary material, the vehicles

rather the mystery threads that carry the hereditary factors. In man as in other organisms the hereditary material DNA (DEOXY RIBONUCLEIC ACID) is carried by the chromosomes present in the nucleus of every cell of the body. Somatic or body cells have two of each type of chromosomes and are diploid. Gametes or sperms and eggs are haploid i.e. having one of each type of chromosome.

Until 1956 the diploid number in man was thought to be 48 instead of 46. Improved methods for studying the somatic chromosomes have permitted a more accurate and detailed description of the normal karyotype and the discovery of abnormalities responsible for congenital malformations. The cells used for study are obtained from bone marrow, bits of skin or fascia removed by biopsy, or from the white blood cells of a sample of venous blood drawn by ordinary method of venepuncture. Stains such as aceto-orcin or Feulgen's specific for DNA of chromosomes have been used and preparations studied under ordinary light microscope. Individual chromosomes are cut from enlarged photographs, matched in pairs of homologous chromosomes and arranged in

order of descending length ie karyotype formation.

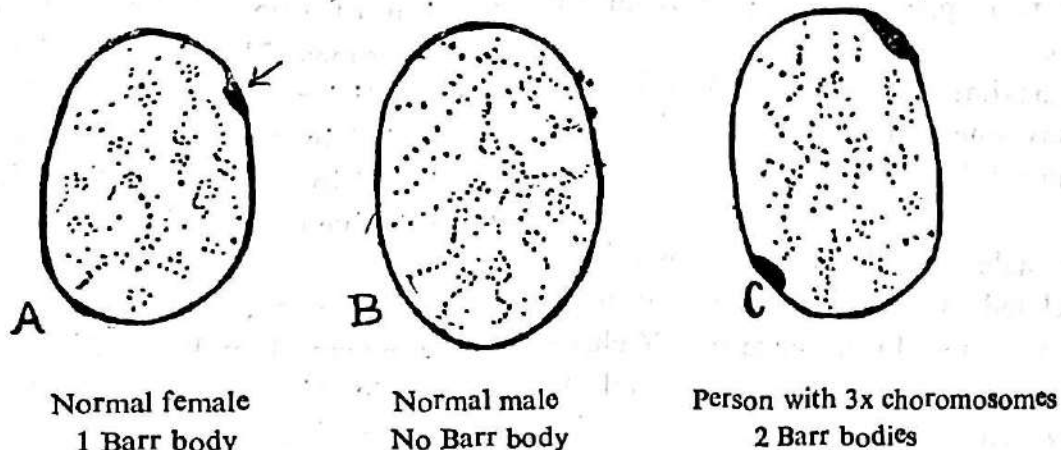
The normal diploid number of chromosomes of man is 46. The sex chromosomes constitution of male is XY and female XX. In addition there are 22 pairs of other chromosomes known as autosomes. Placing these chromosomes in karyotype is at best an approximation. The two sex chromosomes of the female are referred to as the X chromosomes. The male has one X and a small acrocentric chromosome Y. The techniques for identifying homologous chromosomes are varied in some cases autoradiography in which radioactive tritium labelled thymidine is introduced into the chromosomes and is incorporated in a specific manner has also been used.

In the late 1940's Murray Barr discovered a difference in the interphase nuclei (resting nucleus before onset of division or mitosis) of males and females, a chromatin mass called sex chromatin or Barr body is present in normal female but not in normal male. This discovery and others in cases of sex anomaly were the beginning of understanding of mecha-

cells, at least at some stage of interphase. The simplest method for determining sex chromatin status makes use of epithelial cells obtained by scraping the lining of the cheek with a tongue depressor. Thus the XX sex chromosome constitution of a normal female and a XY constitution of the normal male can be determined directly from this Barr body analysis.

Now the question arises what is the critical difference between a normal male and female ? Is the human male a male by default ? Does the presence of one X Chromosomes determine a male ? Or does the Y chromosome play an active role in determining maleness ? The answers to these questions have come largely from the study of sex anomaly.

When the Barr technique was applied to sex anomalies of man it was found that certain persons had sex chromatin findings inappropriate to the phenotype (external characters). Specifically persons with Turners syndrome have external genitalia of female type but are chromatin negative (i.e. no Barr body) and persons with Klinefelters syndrome are chro-



nism of the determination of sex in man and other mammals.

The Barr body can be identified in a significant proportion of cells in all tissues of the human female and there is reason to think that it is present in essentially all female somatic

matin positive despite external genitalia of male type. The sex chromatin findings suggest a sex chromosome abnormality which is indeed found on study of metaphase chromosomes. In most cases of the chromatin negative Turners syndrome, there are 45 chromosomes and only

one sex chromosome X. The sex chromosome constitution is said to be XO ("X-OH not Zero). In chromatin positive Klinefelters syndrome 47 chromosomes are found, there are two X chromosomes and a Y. The sex chromosome constitution is said to be XXY.

The Klinefelters syndrome occurs once in every 400 to 600 "male" births ; the Turners syndrome is less frequent, occurring about once in each 5,000 "female" births. Other sex chromosome anomalies have been discovered in recent years. One of these, phenotypically female, has two Barr bodies in the nuclei of buccal scrapings, and a sex chromosome constitution of XXX. Another of these, phenotypically male, has two Barr bodies and a sex chromosome constitution of XXY. Many of these patients are mentally retarded and have been detected by sex chromatin surveys in institution for the retarded. The brain is such a delicately balanced mechanism that it is most vulnerable to be being thrown out gear by chromosomal aberrations.

At least two principles emerge from all these studies.

- (1) The maximum number of Barr bodies in any one cell is one less than the number of X chromosomes.
- (2) The male sex phenotype is precisely correlated with the presence of a Y chromosome. In absence of a Y chromosome the sex phenotype develops along female lines regardless of the number of X chromosomes present.

The mechanism of sex determination in man and mouse is different from that in *Drosophila* and many other non mammalian forms in which the role of the Y chromosome is not the active one as it is in most mammals. The

mechanism in man parallels that in the plant melandrium.

Abnormalities of the Autosomal chromosomes :

The first autosomal abnormality to be described in man was the one responsible for Mongoloid idiocy, or Down's syndrome. All patients with this characteristics phenotype have all or most of chromosome "21" triply represented rather than doubly ; though it is not certain whether chromosome 21 or 22 has this anomaly. The clinical symptoms of this are mental retardation, a peculiarity in the folds of the eyelids suggesting the eyes of mongoloid people. They are also short with stubby hands and feet. Monogoloid idiocy is by no means rare. It occurs in each 500 or 600 births, being more frequent when mothers are older than average. There are many more but they are still in the stage of investigation.

Chromosome changes in cancer :

In many cases of major form of leukemia, a chromosomal aberration in the form of a deletion of one of the arms of the smaller chromosomes (21 or 22) has been found. The abnormalities is confined to the blood cell line as studied in cultures of bone marrow and is not found in other somatic cells, for example, those derived from skin.

In summary, the chromosomal basis of certain congenital malformations, sex anomalies, neoplastic diseases has been elucidated. As techniques improve, human cytogenetics will be able to detect more subtle changes that may prove to be more important to man than the obvious changes already discovered. In recent years, and specially in the last decade, there has been great increase in appreciation of the importance of genetics in understanding diseases of man. The Atomic Age has led to the intensi-

fied study of genetics specially effects of radiation.

The above account is not merely a text book record but work on this particular field has been done and the above results have been verified by me and two of my other classmates as a part of our course at Banaras Hindu University. Further research on this problem is being carried on by Dr. A. Mukerjee at Calcutta University. Further progress will play a very important role in medical genetics and help mankind to a great extent, because at present most of the viral, bacterial,

physiological etc. diseases have been investigated to the maximum point. It is the genetical diseases which now occupy the topmost rung in the ladder of medical investigation and study on them is very much needed specially in the present state of affairs—the atomic age, a time when genetics is being the most talked of subject. Human Genetics is perhaps more interesting than most other problems of sciences, it is a key to the mysteries of all the medical treasures. This is the one field which will have to be worked on with great fervour so as to lead mankind to the road of success.



The mitotic metaphase chromosomes of a somatic cell of a male, arranged in a karyotype (Normal).



The mitotic metaphase chromosomes of a somatic cell of a female, arranged in karyotype (Normal).

MY THOUGHT

Daniel Shihabul Haque Mazumder

2nd Year Science

My days my night, myself I make
And've there no ranges ;
To shape the life, like a master make
Which can've its no changes.

My time and work, myself I select
For my own purpose ;
To check it wheather, it can reflect
With not a single point to oppose.

My mind I, myself ask ;
What wrong I've committed ?
Whether it's in the course of my task
Which I've already remitted.

Though, I know friends should multiply
With a mind of all
The enemy divided,
Which is a constant roll.

Yet, I ask why I am off
From all my joys ;
And having my soul always aloof
From all my friendly toys.

I pray to God, for all my wrong
If, I have committed any ;
And do bring upon me a purest song
Of sweetness and full of jolly.

IF MY DREAM COMES TRUE

Karuna Deka
3rd year Science

After the day's fierce fight for living
A piece of bread through mouth pushing,
When I threw myself on the bed
A deep fairy sleep me embraced.

And on my mind's Screen
Cast the 'Dream Queen'—
An enchanting divinely Scene.

Around my just adorned hut
Washed out with a new light
The old earth glittered.

Everything new bright as dew,
Men too changed that I knew.

All love peace, bury malice,
Kiss and kiss never finish.

No one is rich all have dish,
There is no word like crisis.

Adulterant dies, corruption fly
There is no more hue and cry.

All care-free and are in glee
Live as in the same family.

I too in glee I feel free
With their mother, children three.

There playing the three, worry no longer
Crying "Pappa, Mamma die of hunger".

Happy and content seems their mother
Putting an end to the daily shower—
"Inefficient of feeding and clothing
Why should one be a father?"

Now no wonder by being a grinder,
I can feed them and clothe to better.

Ah ! my Jem falls when running,
So pick him up I was hurrying ;
But, alas ! it is my bed where I am
And with heart breaking 'Mamma dying (of
hunger) Scream
Grim reality of life came.

I, yet, with a sigh, prayed God—
"Let, O God ! my dream be true !"
O ! if my dream comes true !

HUMUS : A Natural Fertilizer of Soil

Rajen Borah
3rd yr. Science.

Soil is the top cover of the earth, scatterdly extending from the tropic to the polar, giving shelter, food and other accomodation for us. The word "soil" originates from the Latin word "Solum". The Soil is a complex composite mass which consists of wreathereç rock materials mixed with decomposed organic matter derived from the remains of plants and animals. Webster defined soil as "the loose surface material of the earth in which plants grow, in most cases consisting of disintegrated rock with an admixture of organic matter". There are other views also ; according to Ries & Watson's view, "The Soil may be considered as the superficial, unconsolidated mantle of disintegrated and decomposed rock materials, which, when acted upon by organic agencies and mixed with varying amounts of Organic matter, may furnish conditions necessary for the growth of plants." Humus as an organic substance of soil helps to increase the fertility of the soil. Here we shall give a brief description of humus and its function as a fertilizer.

We can not expect good plantation on non-fertile soil. Fertility of the soil depends upon

its humus content and mineral content. The Soil humus comprises the dead organic matter of the soil derived mainly from the decay of dead remains of plants and plant parts. We often see that some crops leave more residue materials in the form of stalks of maize and cotton and stubble of wheat etc. Out of their multifunction the chief two are the protection of the soil and the production of humus by the action of micro-organisms. The different parts of the plant body like stem, root, leaves etc. are converted by the soil micro-organism (bacteria, fungi & protozoa) into a dark coloured amorphous substance. This specially made substance is a completely different one from the original plant tissue and its parts. The role played by the common earthworm in the formation of humus is not negligible one.

In humus formation, the nitrogen, phosphorus, calcium, potassium and other minerals bound up in the dead plant and animal remains, are changed into soluble compound in which form they can be again absorbed by the living plants. Humus is in fact, one of the most

important sources of necessary nutrients, especially nitrogen, for the majority of plants. The following 13 elements are constants in all plants : Potassium (K), Calcium (Ca), Magnesium (Mg) Iron (Fe) and Sodium (Na) among the metals and Carbon (C), Hydrogen (H), Oxygen (O₂), Nitrogen (N), Sulphur (S), Phosphorous (P), Chlorine (Cl) and Silicon (Si) among the non-metals.

Humus is dark in colour, light in weight and more or less intimately mixed with other soil components. It greatly improves the physical condition of the soil which in turn controls to a very great extent the supplies of water and air to the roots. Humus makes the soil porous by separating the clay particles. This increases aeration and percolation of water and its absorption by the soil. In such soil, roots readily penetrate and bacterial activity increases. In its last stage of decay humus occurs in colloidal state and together with clay forms the colloidal complex of the soil. Humus possesses a great water holding capacity and so, soils rich in humus can support good vegetation even in regions of moderate rainfall.

The soil containing a high amount of lime (Calcium Carbonate) is alkaline and soil containing humus is acidic. The roots increase the acidity at their surfaces by means of Co₂. This Co₂ is enough to increase the solubility of the soil Phosphates and Carbonates. Most of the field crop prefer acidic soil but Wheat,

Barley, Sorghum, Tobacco, Sugar-beet, Chillies etc. do not prefer acidic soil. On the other hand, Rice, Oats, Maize, Cotton, Soybean etc. tolerate acidity fairly well.

Humus, therefore, is a source of plant food or fertilizer. This natural soil fertilizer is the top soil which develops as a result of the combined effects of weathering and the activities of living organism. If the humus constituents become less on the top soil, automatically there will be a scarcity of food for the plant kingdom. It is seen that the humus accumulation is usually a very slow process and hence, same plot of soil can not provide good cultivation in every year.

There is one "Ignition method" to find out the humus content of the soil. This method helps to select a good plot of soil which is rich in humus—a natural soil fertilizer. After heating a lump of soil at 110° C to drive off the water, it is cooled in a desiccator and then the weight is recorded. Next in a platinum crucible the dehydrated soil is burnt at a high temp. for about an hour. During ignition, fumes are seen to escape. After complete combustion the desiccator is cooled and the weight is taken again. The loss in wt. almost approximately represents the quantity of humus originally present in the soil sample. Then calculating the humus content of the soil on a percentage basis we will get the results.



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The sun was setting behind the horizon—making the sky look red as if it was mourning the death of someone dearest or it was sad at one's parting—yes the sun was parting away from the people after shining for the whole day, and allowing the moon to come and take its place.

Mr. Das returned home after his day's work in the office. He was an executive in a large exporting firm, earning a good income of

rupees two thousand a month. The family was not a large one—one may call it a modern family consisting of Mr. Das himself, his wife Mrs. Sheela Das, Vandana, his eldest daughter doing her degree Arts in a local college, Manoj, his son, only a month's junior to Vandana studying in the same class with his sister, and the youngest member Arun—preparing for his Senior Cambridge. But, Manoj was not among them now.

This day—the 5th of August was a horrible day for the whole family. Radios were tuned on in the neighbourhood, but it was a gloomy atmosphere inside Mr. Das' house. Everyone seemed happy but for the Das family. Last year on this day the Das family had lost someone dearest to them. Mr. and Mrs. Das had lost their son, Vandana and Arun lost their beloved brother Manoj. Life to them was miserable now, specially for Vinoo (as Vandana was called) for she loved her brother—her Manoj than any one else. Manoj was a type of brother whom every sister longs to have, and Vinoo considered herself to be the luckiest girl. She often used to tell about her brother to her friends. There was no end to her talking. But this was not now. It was since one year now, Manoj was not to be seen around any more. Only his memory was hovering around inside the house. But even now when Vinoo is left alone to herself, she finds Manoj around her, smiling at her. His faint image is seen.

Vinoo was sitting alone in her room, surrounded by loneliness. The room was dark. She did not put on the light except for the stream of light falling straight on the face of Manoj—of course the face in the photo, and Vinoo was sitting in front of her brother. Tears came rolling down from her eyes and rolled down over her soft cheeks. What were the tears for, only she knew it and she ought to know it. Only the sweet memory of her brother was left behind. At times when loneliness envelopes her, she thinks over the days and happy moments come to her memory, when she knew no sorrow or fears. Only then she thought with regret of those joyful days which she let pass away so swift, so fast, that now she was left alone with only the past.

“Arun”, called out Mr. Das to his youngest son. He was just getting ready to go to his school to play badminton. He was a good player. This time he got a chance to represent his school in the Inter-school Badminton Championship. Actually Arun was not willing to play, it was only for his dearest sister that he was playing.

“Coming papa”, Arun replied and went to his father’s study room where Mr. Das was going through the newspaper sipping, his tea.

“Where is your didi, Arun”, inquired Das.

Arun said, “Might be in her room. Wait, I will call her,”

“Yes, yes call her,” said Das.

Arun went and found Vinoo sitting alone in her room before Manoj’s photo. She was still sobbing. Tears were rolling down her cheeks.

“Didi,” called out Arun and he put on the lights. “What are you doing here sitting

alone. Oh ! I see you are talking to Manojda,” and he took a long breath. Two drops of tears came rolling down his cheeks and Vinoo looked towards Arun and quickly wiped out her tears from her eyes.

“Didi, do you think you are doing justice to yourself ? All this crying is for nothing. Do you think Manojda was your brother only, was he not my brother also ? Do you think you alone love him ? I have the same love for Manojda as you have. Don’t I feel sorry for him ? But that does not mean one must go on crying. This will only make Manojda’s soul pain more. He is still watching us. What, if he is not with us. Now come on, get up and get changed. Just have a look at your face how it looks. And remember that I request you not to shed tears like this. I hope you will keep my request as I am sure that you love me.”

“Arun”, cried Vinoo, “Do you think that I do not love you ? I love you much as I love Manoj. You two brothers are the two eyes of mine. I am the luckiest girl to have you. Any way, what do you want ?”

“Oh ! I forgot” Arun said, “papa is calling you. I don’t know why.” And he went away.

Vinoo got up, went to the bathroom and washed her face and got her dress changed. She went to her papa’s study room, but he was not here. Das was in the dining room having his evening meals with his wife. Vinoo went there and got down on a chair. She tried to bring a smile on her face in vain.

“Vinoo, I am noticing some kind of gloominess on your face since the last few days,”

said Das. "And moreover I heard from your mummy that you are not taking any interest in anything these days. What is all this ? I know your brother's thoughts are coming to your mind. But that is not the way to mourn. Do you think you only lost a brother ? I lost my son, Arun lost his brother. But we are not like you always. Arun is not always crying. Do you think I don't love Manoj or Arun does not love him ?" There was some excitement on his face as he said this. He continued, "Might be that God did not want Manoj to stay with us. I might have done something bad—committed some sin sometime back for which God is punishing me. It is with man to come and go. You go to visit some of your relatives and again come back. In the same way we come to this earth on a visit, to do some thing and again go back. This earth is not a permanent living place, but a temporary resting place. One comes and goes. That is the law," and he took a long breath saying this.

Then he asked Vinoo about the function in her college. Vinoo replied that she was going to sing a song which was Manoj's favourite. She thought how happy Manoj would have been, had he been present now.

It was near about nine in the morning. Everybody seemed busy with his or her own work. One could hear Arun reading aloud in his room, Mr. Das was already on his to the office, and Vinoo was helping her mother with the morning dishes, and she was to go to the college also.

Vinoo was ready. She called out—"Mummy, bye, bye. See you in the evening." And she went away. There was the car to

drop her in the college. There was a time when Manoj used to drive the car, but now a driver has been engaged. There was the office-car for Mr. Das. Vinoo got down in her college.

"Hello, Vinoo darling." This was Maya, her favourite and intimate friend. Both the girls were in the same class having the same subjects. They both shared their sorrows and happiness among themselves.

"Hello", replied Vinoo. "But listen, how many times have I told you not to use the word 'Darling'. Do you think the word is beautiful ? Does the word have any charm in it ? These are all showy words only meant to flatter. This is the last time and if I hear it again from you, then you are going to have a good beating from me. Do you understand ?"

"Understand", replied Maya, "now come on darling, oh, I forgot, I am sorry. Any way, I wanted to tell you one thing." They both started towards their class.

"Do you know Vinoo, that there is a new boy admitted in our class? Incidentally, I saw him." Maya said. "But what shall I do, if someone comes or goes? It may mean something for you." Saying this, Vinoo smiled.

"No, I wanted to tell you that the new-comer resembles 'My Manoj'—er—I mean to say your brother Manoj." Maya blushed as she said this. She had put a little stress on the two words 'My Manoj.'

Vinoo smiled. She knew—yes, she knew Maya more than anyone else. Yes, Maya was not wrong in saying 'My Manoj.' Vinoo knew that Maya loved Manoj and that it was