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PAKISTAN JOURNAL OF HEALTH

Vol. XVI *JULY, 1966* *No. 2*

A QUARTERLY
DEVOTED TO HYGIENE, PREVENTIVE MEDICINE, MEDICAL SCIENCE AND ALLIED SUBJECTS

PUBLISHED BY :

The Institute of Hygiene & Preventive Medicine
6, BIRDWOOD ROAD, LAHORE

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Pakistan Journal of Health

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INFORMATION

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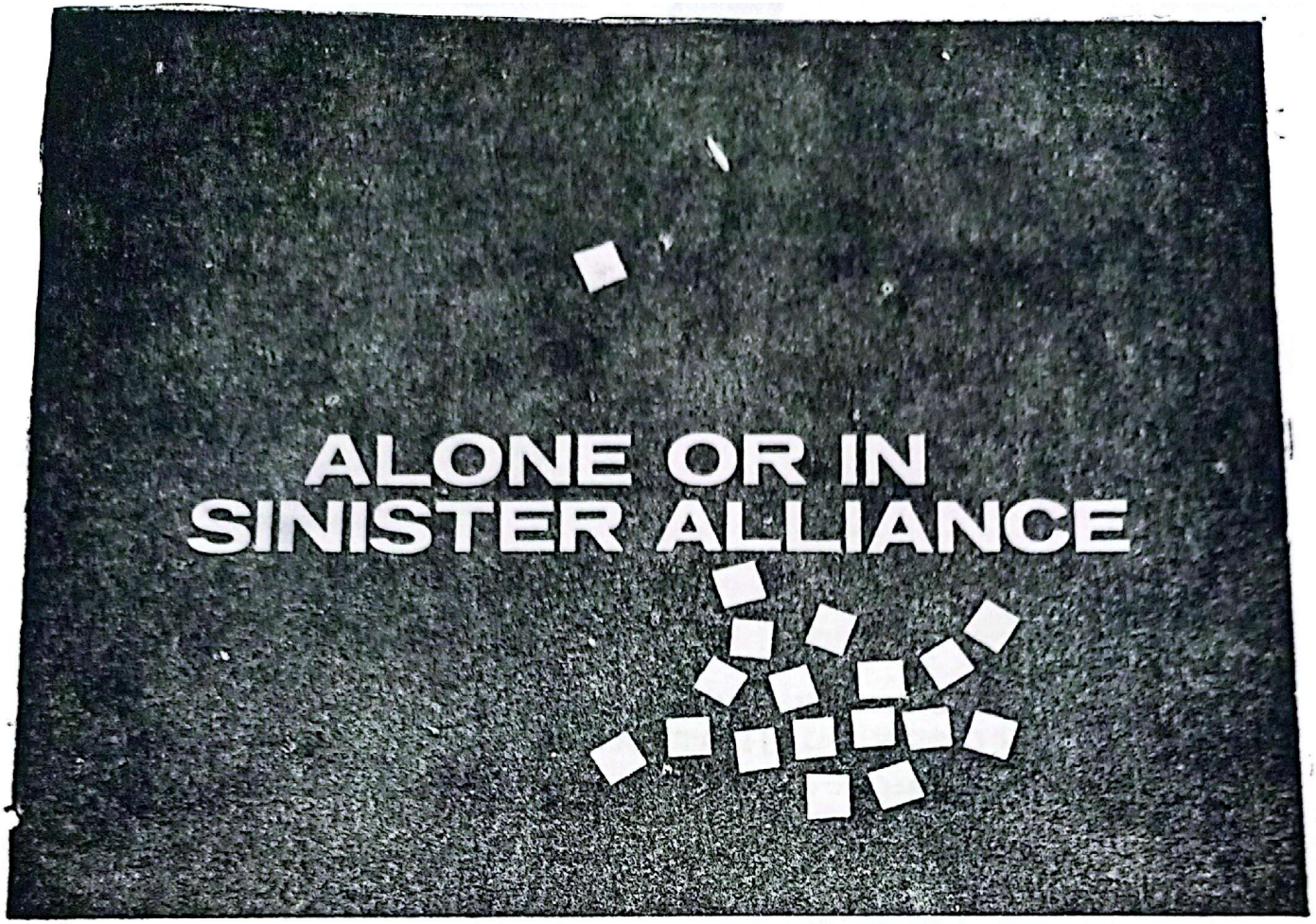

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LIFE HISTORY OF HOOKWORM IN NATURE AS AFFECTED BY PHYSICAL CONDITIONS OF THE SOIL

By

1. Dr. Nazir Alam Nazu, M.B., B.S., D.P.H. (Pb.), D.T.M. & H. (London) Assistant Professor of Medical Entomology and Parasitology, Institute of Hygiene and Preventive Medicine, Lahore.

2. Dr. Nazir Ahmad, M.A. (Pb.), M.B., B.S. (Pb.), D.P.H. (Pb.), M.S. (Harvard), Dean, Institute of Hygiene and Preventive Medicine, Lahore.

Objective—The following experiments were carried out with a view to find out breeding trends of hookworm disease in different soils under natural conditions. Different soil samples were seeded with known number of hookworm ova and developmental stages of the parasite were studied from the time larvae hatched to the time they attained maturity. Observations were also made if the hookworm larvae could develop on the superficial crust of soil, under different physical conditions.

Methodology and Material used—The methods employed during these experiments were based on those adopted by Dr. William W. CORT[2] (1922) in the investigations on the control of Hookworm disease in America. Four different types of soils, free from hookworm and nematode larvae were taken. Freedom from previous infestation was ascertained by repeated examinations of the soil samples, both by means of isolation apparatus and by examination under the microscope. Characteristics of these different types of the soils were noted. Four earthen basins of diameter 7½" & depth 3½" each, were filled with different types of soils. These were thoroughly wetted with boiled water before making an experiment. Fresh stools, containing hookworm ova were deposited on the soil surface in each earthen basin. The date of seeding, the humidity, room temperature and atmospheric temperature were recorded. Three experiments were repeated on each type of soil.

Procedure—Characteristics of the stool deposited, and total number of ova gram of faeces were noted in each case. A record of the dates on which the stools were examined and the room and atmospheric temperatures on that date was maintained. Physical characteristics of each soil sample were noted. After every 24 hours, the physical characters of stools were noted and a small sample of the faeces was taken for the quantitative estimation of the ova, the number of ova containing larvae were counted. The results of the quantitative estimation was expressed at the rate of one gram of faecal matter. In addition to the above sample, 50 gms. of superficial soil, upto 3 inches depth was taken from beneath the faecal deposit and presence or absence of hookworm larvae was determined. Egg counting was carried with Norman Stoll[5] (1923) method. Briefly speaking this technique consists in weighing 3 grams of faeces into a large size test tube. Decinormal solution of sodium hydroxide is poured in the test tube to a 45 c.c. mark and stoppered. The mixture is vigorously shaken alongwith glass beads. The material is then immediately sampled with a pipette graduated to 0·15 c. c. and examined on a glass slide. The total number of eggs found, multiplied by 100, represents the number of eggs per gram of faeces used. The different developmental stages observed during these experiments are shown in Fig. I.

For culture of the stools then soil sample in the earthen basin was first treated to a temperature of 150° F to ensure the killing of all free living nematodes and their larvae. The hot water was then drained out of the earthen pans. The stool was then spread on the surface of the treated soil in a uniform thin layer and some ash was dusted on the faeces. The preparation was moistened occasionally and the larvae which were extracted are described below.

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TABLE I—continued

OBSERVATION B

STOOL DEPOSITED ON 2RD JANUARY, 1966. FAECES WELL FORMED CONTAINING 400 OVA/PER GRAM OF FAECES AND THE OBSERVATIONS ARE TABULATED AS BELOW

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature				Humidity
						Room Temp. in F°.		Atmospheric Temp. in F°		
						Dry	Wet	Max.	Min.	
1	4th January, 1966	1st ..	Dark brown crust, moist interior, reduction in bulk negligible.	Ova—200 .. *Larvae—*Nil.*	Negative	60	54	72	42	35%.
2	5th January, 1966	2nd ..	Dry exterior moist interior volume reduced to 1/3 of the original.	Ova—100 .. *Larvae—100	Negative	59	54	71	39	36%.
3	6th January, 1966	3rd ..	As on 2nd day. Volume reduced by 1½ its original volume.	Ova—100 .. *Larvae—100	Positive ..	60	55	70	38	34%.
4	7th January, 1966	4th ..	Dried almost ..	Ova—*Nil.* .. *Larvae—*Nil.*	Positive	60	55	71	39	30%.
5	8th January, 1966	5th ..	As on 4th day ..	Ova—*Nil* .. *Larvae—*Nil.*	Positive ..	60	55	72	42	30%.
6	10th January, 1966	7th ..	As on 4th day ..	Ova—*Nil* .. *Larvae—*Nil.*	Positive ..	60	55	74	42	42%.
7	11th January, 1966	8th ..	Faeces scanty and scattered.	Ova—*Nil.* .. *Larvae—*Nil.*	Negative	61	55	75	44	47%.
8	12th January, 1966 to 17th January, 1966	9th to 14th.	Faeces totally disappeared.	All observations Negative ..						

TABLE I —continued.

OBSERVATION C

STOOL DEPOSITED ON 18TH JANUARY 1966. FAECES/SEMI-SOLID CONTAINING 900 OVA PER GRAM AND THE OBSERVATIONS ARE TABULATED AS BELOW :—

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TABLE I —continued.

OBSERVATION C

STOOL DEPOSITED ON 18TH JANUARY 1966. FAECES/SEMI-SOLID CONTAINING 900 OVA PER GRAM AND THE OBSERVATIONS ARE TABULATED AS BELOW :—

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry	Temperature: Room Temp. in F°. Wet	Temperature: Atmospheric Temp. in F° Max.	Temperature: Atmospheric Temp. in F° Min.	Humidity
1	19th January, 1966	1st ..	Reddish solid mass dry outside, interior moist size no reduction.	Ova—600 *Larvae—100 ..	Negative	60	55	71	39	30%.
2	20th January, 1966	2nd ..	Black crust moist interior volume reduced to ½ the original.	Ova—400 *Larvae—200.	Negative	60	55	72	42	30%.
3	21st January, 1966	3rd ..	Faeces in Putrified state 2/3 reduction in volume.	Ova—200 *Larvae—100.	Positive ..	60	55	74	43	35%.
4	22nd January, 1966	4th ..	Faeces as on 3rd day	Ova—200 *Larvae—200.	Positive ..	60	55	74	42	42%.
5	24th January, 1966	6th ..	Faeces remnant ..	Ova—100 *Larvae—100.	Positive ..	60	54	74	43	42%.
6	25th January, 1966	7th ..	Faeces remnant and scattered on soil.	Ova—*Nil* *Larvae—*Nil*	Negative	61	55	75	44	47%.
7	26th January, 1966	8th ..	Faeces mixed with soil and not identified.	*Nil*	Negative	61	55	75	47	36%.
8	27th January, 1966 to 1st February, 1966.	9th to 14th.	All observations Negative.							

*Ova containing Larvae.

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OBSERVATION II

Earthen Basin II—Type II :

Physical Characters—Sandy soil free from organic matter. This type of soil is devoid of qualities of retention of water and is with no vegetation around. Non-calcarious and non-argillaceous. No shade provided. Soil wetted initially but not wetted during the experiment.

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TABLE II

OBSERVATION A

STOOL DEPOSITED ON 27TH AUGUST, 1965. FAECES SEMISOLID, SLIGHTLY FERMENTED CONTAINING 600 OVA/GM.

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry	Temperature: Room Temp. in F°. Wet	Temperature: Atmospheric Temp. in F°. Max.	Temperature: Atmospheric Temp. in F°. Min.	Humidity.
1	28th August, 1965	1st	Dry Brown crust moist interior Reduction in bulk not noticeable.	Ova—400 .. *Larvae—*Nil.*	Negative	89	81	88·0	79·0	66%.
2	29th August, 1965	2nd	Faeces scattered from margin, centre, moist. Reduction by one-third volume.	Ova—300 .. *Larvae—*Nil.*	Negative	89	82	93·9	76·3	73%.
3	30th August, 1965	3rd	Faeces—in condition of advanced decay. Reduction by ½ volume.	Ova—200 *Larvae—100	Negative	87	82	93·9	76·1	69%.
4	31st August, 1965	4th	Faeces volume reduction by two-thirds.	Ova—200 *Larvae—100 ..	Negative	87	82	96·9	78·8	66%.
5	1st September, 1965	5th	Faeces ramnant	Negative ..	Negative	91	81	99·2	7·7	40%.
6	2nd September, 1965	6th	Faeces remnant	Negative ..	Negative	90	82	99·2	77·9	69%.
7	3rd September, 1965	7th	Faeces disappeared (mixed with soil)	Negative ..	Negative	90	82	94·0	75·6	60%.
8	4th September, 1965 to 10th September, 1965.	8th to 14th.		All observations Negative.						

*Ova containing Larvae.

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TABLE II —continued

OBSERVATION B

STOOL DEPOSITED ON 3RD JANUARY, 1966. FAECES WELL FORMED CONTAINING 400 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE AS BELOW

Serial No	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry	Temperature: Room Temp. in F°. Wet	Temperature: Atmospheric Temp. in F°. Max.	Temperature: Atmospheric Temp. in F°. Min.	Humidity
1	4th January, 1966	1st	Dark brown crust, moist interior, reduction in bulk by ¼.	Ova—200 .. *Larvae—*Nil*	Negative	60	54	72	42	35%.
2	5th January, 1966	2nd	Faeces dried and darkened central core moist. Reduction in volume to ½.	Ova—200 .. *Larvae—*Nil.*	Negative	59	54	71	39	36%.
3	6th January, 1966	3rd	Faeces scattered at the margins and dried completely at margins but moist still in the centre, volume 2/3 reduced.	Ova—100 .. *Larvae—100	Negative	60	55	70	38	34%.
4	7th January, 1966	4th	Faeces scant y and scattered.	Ova—100 .. *Larvae—100.	Negative	30	55	71	39	30%.
5	8th January, 1966	5th	As on 4th day ..	Ova—*Nil* .. *Larvae—100.	Negative	60	55	72	42	30%.
6	10th January, 1966	7th	Faeces Remnant ..	Negative ..	Negative	60	55	74	42	42%.
7	11th January, 1966	8th	Faeces Remnant ..	Negative ..	Negative	61	55	75	44	47%.
8	12th January, 1966 to 17 th January, 1966.	9th to 14th		All Observations	Negative					

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TABLE II—continued

OBSERVATION C

STOOL DEPOSITED ON 18TH JANUARY, 1966. FAECES SEMI-SOLID CONTAINING 900 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE AS FELOW :—

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry	Temperature: Room Temp. in F°. Wet	Temperature: Atmospheric Temp. in F°. Max.	Temperature: Atmospheric Temp. in F°. Min.	Humidity
	19th January, 1966.	1st ..	Reddish solid mass dry exterior moist interior size 1/3 reduced.	Ova—600 .. *Larvae—*Nil*	Negative	60	55	71	39	30%
2	20th January, 1966	2nd ..	Black coloured dried exterior inside volume 2/3 the original.	Ova—500 .. *Larvae—*Nil.*	Negative	60	55	72	42	30%
3	21st January, 1966	3rd ..	As on 2nd day ..	Ova—300 .. *Larvae—100	Negative	60	55	74	43	35%
4	22nd January, 1966	4th	Faeces almost dried, inside slightly moist.	Ova—300 .. *Larvae—100.	Negative	60	55	74	42	42%
5	24th January, 1966	6th ..	As on 4th day ..	Ova—100 .. *Larvae—100.	Negative	60	54	74	43	42%
6	25th January, 1966	7th ..	Faeces scanty and scattered.	Ova—*Nil.* .. *Larvae—*Nil.*	Negative	61	55	75	44	47%
7	26th January, 1966	8th ..	Faeces remnant and mixed in the soil.	Ova—*Nil* ..	Negative	61	55	75	47	38%
8	27th January, 1966 to 1st February, 1966.	9th to 14th.		All Observations Negative						

*Ova containing Larvae.

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OBSERVATION III

Earthen Basin III—Type III:

Physical Characters—Loamy soil is a mixture of sand clay and humus. Covered with grass and vegetation. Argillaceous matter present. Soil kept moist.

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OBSERVATION A

STOOL DEPOSITED ON 7TH SEPTEMBER 1965. FAECES PALE YELLOW, FERMENTED MASS, CONTAINING 900 OVA/GRAM OF FAECES. THE OBSERVATIONS FOLLOWED ARE AS UNDER

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature				Humidity
						Room Temp. in F°.		Atmospheric Temp. in F°.		
						Dry	Wet	Max.	Min.	
1	8th September, 1965.	1st ..	Faeces dark mass, crust forming, reduction by ¼ volume.	Ova—800 .. *Larvae—*Nil*.	Positive ..	85	80	100·3	76·7	73%
2	9th September 1965.	2nd ..	Faeces as on 1st day. Reduction by ½ volume.	Ova—700 .. *Larvae—*Nil*.	Positive ..	88	81	100·9	76·4	74%
3	10th September, 1965.	3rd ..	Faeces as on 1st day. Reduction by ⅔.	Ova—400 .. *Larvae—*Nil*.		91	80	101·0	78·0	72%
4	11th September, 1965.	4th ..	Faeces remnant ..	Ova—*Nil* .. *Larvae—*Nil*.	Positive ..	89	81	100·3	76·7	71%
5	13th September 1965.	6th ..	Faeces mixed with soil, totally disappeared.	*Nil* ..	Positive ..	89	81	100·2	76·4	71%
6	14th September, 1965.	7th ..	Ditto ..	*Nil* ..	Negative	87	82	98·6	77·9	69%
7	15th September, 1965 to 21st September, 1965.	8th to 14th.		All observations Negative.						

*Ova containing Larvae.

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TABLE III—continued

OBSERVATION B

STOOL DEPOSITED ON 3RD JANUARY, 1966. FAECES WELL FORMED CONTAINING 400 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE AS BELOW

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry.	Room Temp. Wet.	Atmospheric Temp. F°. Max.	Atmospheric Temp. Min.	Humidity
1	4th January, 1966	1st ..	Dark brown mass, slightly dried exterior, in volume no noticeable reduction.	Ova—300 .. *Larvae—*Nil*	Negative	60	54	72	42	35%
2	5th January, 1966	2nd ..	Dark coloured crust formed inside moist, ¼ volume reduced.	Ova—300 .. *Larvae—*Nil.*	Positive ..	59	54	71	39	36%
3	6th January, 1966	3rd ..	Faeces exterior dried and moist interior and is putrified; volume one-half.	Ova—300 .. *Larvae—*Nil.*	Positive ..	60	55	74	38	34%
4	7th January, 1966	4th ..	As on 3rd day ..	Ova—200 .. *Larvae—*Nil.*	Positive ..	60	55	71	39	30%
5	8th January, 1966	5th ..	Faeces scattered on the surface of the soil.	Ova—100 .. *Larvae—*Nil.*	Positive ..	60	55	72	42	30%
6	10th January, 1966	7th ..	Faeces mixed with soil totally.	Ova—*Nil* .. *Larvae—*Nil.*	Positive ..	60	55	74	42	42%
7	11th January, 1966	8th ..	As on 3rd day ..	*Nil* ..	Negative	61	55	75	44	47%
8	12th January, 1966	9th to 14th		All Observations Negative						

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TABLE III—continued

OBSERVATION C

STOOL DEPOSITED ON 18TH JANUARY, 1966. FAECES SEMI SOLID CONTAINING 900 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE AS BELOW

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry	Temperature: Room Temp. in F°. Wet	Temperature: Atmospheric Temp. in F°. Max.	Temperature: Atmospheric Temp. in F°. Min.	Humidity
1	19th January, 1966	1st ..	Reddish mass exterior dry and interior moist, volume reduced to ¼.	Ova—700 .. *Larvae—*Nil.*	Negative	60	55	71	39	30%
2	20th January, 1966	2nd ..	Dark brown crust, moist volume reduced to half.	Ova—700 .. *Larvae—*Nil.*	Positive ..	60	55	72	42	30%
3	21st January, 1966	3rd ..	Faces as on 2nd day and is putrified.	Ova—400 .. *Larvae—*Nil.*	Positive ..	60	55	74	43	35%
4	22nd January, 1966	4th ..	Faeces dried almost, slightly moist inside.	Ova—200 .. *Larvae—*Nil.*	Positive ..	60	55	74	42	42%
5	24th January, 1966	6th ..	Faeces scattered at the margin.	Ova—100 .. *Larvae—*Nil.*	Positive ..	60	54	74	43	42%
6	25th January, 1966	7th ..	Faeces scanty ..	Ova—*Nil.* .. *Larvae—*Nil.*	Negative	61	65	75	44	47%
7	26th January, 1966	8th	Faeces mixed with the soil.	*Nil* ..	Negative	61	55	75	47	36%
8	27th January, 1966 to 1st February, 1966.	9th to 14th.		All Observations Negative						

*Ova containing Larvae.

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OBSERVATION IV

Earthen Basin IV—Type IV.

Physical Characters—Gravely soil, consisting of fine pebbles mixed with clay and fine grained schist. Non-argillaceous, no vegetation. Soil wetted during experiment by adding water.

TABLE IV

OBSERVATION A

STOOL DEPOSITED ON 20TH SEPTEMBER, 1965. FAECES SEMI-SOLID, DARK, GREEN, FERMENTED CONTAINING 500 OVA/GM OF FAECES. THE OBSERVATIONS ARE TABULATED AS BELOW :—

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TABLE IV

OBSERVATION A

STOOL DEPOSITED ON 20TH SEPTEMBER, 1965. FAECES SEMI-SOLID, DARK, GREEN, FERMENTED CONTAINING 500 OVA GM OF FAECES. THE OBSERVATIONS ARE TABULATED AS BELOW :—

Serial No.	Dates of Examination	No. of days	Character of faeces	Ova Larvae per g. faeces	Soil Larvae	Temperature: Room Temp. in F°. Dry	Temperature: Room Temp. in F°. Wet	Temperature: Atmospheric Temp. in F°. Max.	Temperature: Atmospheric Temp. in F°. Min.	Humidity
1	21st September, 1965.	Ist	Faeces dark mass, crust forming, reduction by ¼ in volume.	OVA—300 *Larvae—*Nil*	Negative	85	78	97.1	93.4	60%
2	22nd September 1965.	2nd	As on Ist day Volume reduced to half.	Ova—300 *Larvae—200	Positive	87	80	90.8	75.9	62%
3	23rd September 1965.	3rd	As on Ist day. volume reduced to third.	Ova—200 *Larvae—200	Positive	88	81	90.5	75.1	62%
4	24th September 1965.	4th	Faeces totally disappeared.	Ova—*Nil* *Larvae—*Nil*	Negative	89	83	89.7	73.3	64%
5	25th September 1965.	5th	Ditto ..	Ditto	Positive	90	84	97.0	70.4	60%
6	26th September 1965.	6th	Ditto ..	Ditto	Positive	91	50	95.4	70.1	61%
7	27th September 1965 to 4th October, 1965.	7th to 14th		All Observations Negative						

*Ova containing Larvae.

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TABLE IV—CONTINUED

OBSERVATION B

STOOL DEPOSITED ON 3RD JANUARY, 1966. FAECES WEEL FORMED CONTAINING 400 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE GIVEN BELOW

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp. in F° Dry	Temperature: Room Temp. in F° Wet	Temperature: Atmospheric Temp. in F° Max.	Temperature: Atmospheric Temp. in F° Min.	Humidity
1	4th January, 1966.	1st	Faeces dark brown mass with a crust. Reduction in Volume ⅓.	Ova—200 *Larvae—*Nil*	Negative	60	54	72	42	35%
2	5th January, 1966.	2nd	Faeces as on Ist day. Vol. reduced to ½.	Ova—200 *Larvae—100	Negative	59	54	71	39	35%
3	6th January, 1966.	3rd	Faeces dried almost and exterior slightly moist.	Ova—200 *Larvae—100	Positive	60	55	70	38	34%
4	7th January, 1966.	4th	As on 3rd day ..	Ova—100 *Larvae—100	Positive	60	55	71	39	30%
5	8th January, 1966.	5th	Faeces remnant and scattered.	Ova—*Nil* *Larvae—*Nil*	Positive	60	55	72	42	30%
6	10th January, 1966.	7th	Faeces disappeared	Ditto	Positive	60	55	74	42	42%
7	11th January, 1966.	8th	Ditto ..	Ditto	Negative	61	55	75	44	47%
8	12th January, 1966 to 17th January, 1966.	9th to 14th		All observations Negative						

TABLE IV—continued

OBSERVATION C

STOOL DEPOSITED ON 18TH JANUARY, 1956. FAECES SEMI SOLID CONTAINING 900 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE GIVEN AS BELOW

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TABLE IV—continued

OBSERVATION C

STOOL DEPOSITED ON 18TH JANUARY, 1956. FAECES SEMI SOLID CONTAINING 900 OVA PER GRAM OF FAECES. THE OBSERVATIONS ARE GIVEN AS BELOW

Serial No.	Date of Examination	No. of days	Character of faeces	Ova/Larvae per gm. faeces	Soil Larvae	Temperature: Room Temp in F° Dry	Temperature: Room Temp in F° Wet	Temperature: Atmospheric Temp in F° Max.	Temperature: Atmospheric Temp in F° Min.	Humidity
1	19th January, 1966.	Ist	Reddish solid mass dry exterior moist inside, volume ½ reduced.	Ova—600 *Larvae—*Nil*	Negative	60	55	71	39	30%
2	20th January, 1966.	2nd	Black coloured, crust, interior moist volume reduced to half.	Ova—500 *Larvae—300	Postitive	60	55	72	42	30%
3	21st January, 1966.	3rd	As on 2nd day ..	Ova—300 *Larvae—200	Positive	60	55	74	43	35%
4	22nd January, 1966.	4th	Faeces almost dried inside as moist.	Ova—200 *Larvae—200	Positive	60	55	74	42	42%
5	24th January, 1966.	6th	Faeces scanty and scattered.	Ova—*Nil* *Larvae—*Nil*	Positive	60	54	74	43	42%
6	25th January, 1966.	7th	Faeces remnant	Ova—*Nil* *Larvae—*Nil*	Negative	61	55	75	44	47%
7	26th January, 1966.	8th	Faecses totally disappeared.	*Nil*	Negative	61	55	75	47	36%
8	20th January, 1966 to Ist February, 1966.	9th to 14th		All observations Negativ						

*Ova containing Larvae.

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TABLE I

These observations were recorded on type I soil. In observation A after 2 days worm larvae, many well nourished and a few starved were noticed. In case 'B' and 'C' the larvae were seen after 3 days and the number of well nourished were comparatively less than the starved ones. In all the three cases the embryo infective stages were not seen in subsequent periods of observations. Superficial soil negative for hookworm larvae on 7th day in one and on 8th day in other two observations and remained so up to 14th day.

TABLE II

On type II soil in all the three observations the hookworm larvae were present the faeces only and only young rhabditiform stages were observed. Superficial soil remained negative throughout these observations during the 14 days period.

TABLE III

In case of type III soil, on the 6th day a rich brood, with well nourished m stages were observed in observations 'A' and 'C' and the same was recorded on the 5th in 'B' observation. In every case all the larvae were sheathed, shape filariform, movements very active. Superficial soil was negative for hookworm larvae on 7th day observations 'A' and 'C' and on 8th day in observation 'B' and remained then negative upto 14th day.

TABLE IV

Amongst three observations on type IV soil, in 'A' and 'C' observations after days hookworm larvae were observed except 'B' where the larvae were seen after days. Eedysis in a few larvae was observed in which the size was larger than the majority of the larvae which were of small size. After 6 days larvae were found at 3" depth soil. Eedysis at this time was not observed, infective larvae were starved. Superficial remained negative for larvae on 7th to 14th day in observations 'A' and 'C' and on to 14th day in case of observation 'B'.

These soils arranged in order of degree of infectivity are as follows:—

Physical type of soil	Stages of larvae
II	Abortive.
I	Young stages only, well nourished.
IV	Young stages, well nourished and starved. infective stages starved.
III	Infective stages, well nourished.

Discussion of Results

The factors essential to the life history of the hookworm in nature the viability of the ova and a physical environment which permits of birth, nourishm and growth. As the larvae feed on faecal material in the early stages, the chara of the faeces should be such as to supply all the physiological proximate principles wh it needs, not only for the purposes of immediate consumption and growth, but purpose of storing reserve food material for future consumption, even though growth completed.

The question of food supply of young or mature stages of hookworm larva important. Briefly summarized, looss's[3] observations indicate that so long as the lar possess the rhabditiform oesophagus it remains in contact with faecal mater The triradiate oesophageal lumen is characteristic of those nematodes (both larval adult forms) which feed on fine organic detritus, in the consumption of which muscular enlargements of the oesophagus and the valves play an important role. fact that the oesophagus later changes from the rhabditiform type indicates that previous method of nourishment is now abandoned.

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Leiper (1910) as quoted by looss,[3] is of the opinion that the need for food plays no further part in the larval life. The length of the life will depend therefore, on the supply of food in the early stages and the nature of the life lived in the later stages, energetic movements on the part of the mature larvae tending to exhaust the reserve of food supply. Temperature induces activity, hence the length of the life would depend partly on this factor.

Beaver (1953) (1) found that in soil wetted once a day the number of viable larvae fell off about 90 per cent within a week, whereas in soil which was not moistened and became dry and loose at surface, most of the larvae lived many days longer. Probably extremely few Larvae survive in tropical soils for more than 6 or 7 weeks.

These physiological considerations explain why starved as well as well nourished growths are not only possible but are of frequent occurrence in nature. What then are the conditions necessary for the growth? Leaving aside the question of food, which is supplied through the faeces, the answer should be looked for in physical factors such as temperature, moisture and oxygen. As these factors are controlled by the physical aspects of an area in nature, it is the character of the area that should determine the life cycle of the hookworm.

The results of the observations materially support this view. There were eight cases which contributed ova for the purpose of the experiments and in all of them the ova were viable. But the results obtained from different types of soils were not the same. The type of the soil which most favoured the growth of the infective stages of the hookworm in the superficial soil were those having type III physical characters whilst the earthen basins having type I and type II physical characters were unfavourable. Briefly summarized then, these experiments suggest that a soil which contains sand, clay and humus (Loamy soil) and is open for cultivation and where temperature, moisture and oxygen is proportionately represented and where the soil contained higher proportion of sandy matter is favourable to optimum growth of hookworm larvae in nature. Purely sandy and heavy clay soils proved most unfavourable.

Conclusions

1. The type of the soil that seems to be most favourable to the development of hookworm larvae is unshaded loamy soil covered with grass and vegetation, such as the fields under cultivation. Purely sandy soils and heavy clay soils are less favourable and the development in these may be "abortive".

2. The observations undertaken suggest that it may be possible to select a defaecation ground on which the developmental stages of hookworm can be brought under control. This may be important in the very frequent condition where the immediate establishment of a proper conservancy system is impracticable, as is often observed from the promiscuous defaecation habit of majority of people in rural areas of our country.

Acknowledgement

Messrs. Muhammad Allah Dad and Muhammad Shafi, Senior Laboratory Assistants, deserve acknowledgement for carefully following our instructions throughout these experiments.

References

(1) Beaver, P. C. (1953) Persistence of hookworm larvae in soil. *Am. Jour. Trop. Med. Hyg.* 2: 102—108..

(2) Cort W. W. (1922). Investigations (on the control of hookworm disease II. Am. Jour. Med. Res. Vol. X. No. 2.

(3) Looss A. (1911). The Anatomy and Life History of *Ancylostoma duodenale* (Dub.) Part II. The Development in the free state. Ministry of Education Egypt. *Records of the School of Medicine IV.*

(4) Raymond M. Cable (1957). An illustrated Laboratory Manual Parasitology. *Burgess Publishing Co., Minnearpolis, Minesota.*

(5) Stoll, Norman (1923). Investigations on the control of Hook worm disease XV. *Am. Jour. Hyg.* No. I.

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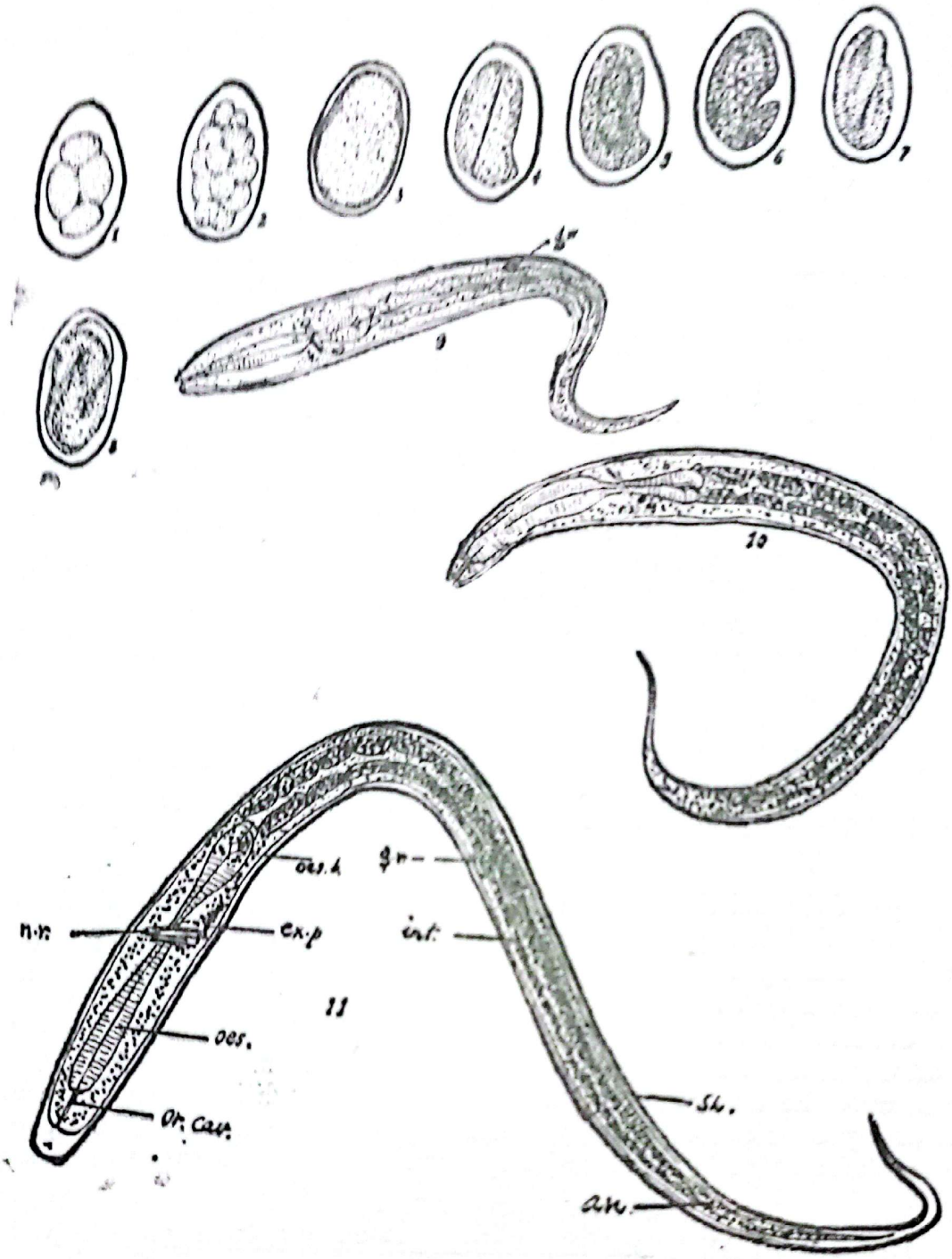

FIG. I

Stages in the life cycle of Hookworm from egg to infective Larva which were observed during these experiments.

1. Egg of Ancylostoma duodenale at the time of leaving the host,
2-8. Stages in segmentation and development of embryo in the egg.
9. Newly hatched embryo.
10. Second stage larva.
11. Third infective stage larva.

an=anus
int=intestine
oes. b=oesophageal bulb
ex. p=excretory pole
nr=nerve ring
sh=sheath
gr=genital rudiment.
oes=oesophagus
or. cav=oral cavity

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INCIDENCE AND EPIDEMIOLOGY OF HYDATID DISEASE IN WEST PAKISTAN/A PRELIMINARY ASSESSMENT

by

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Introduction

Although hydatid disease is frequently incriminated in surgical cases in West Pakistan yet no serious efforts were ever made to know the real incidence of the dreadful disease in any district of the Province.

Our knowledge of the reservoirs and vector hosts is not complete. A thorough survey of Echinococcosis in mongrel dogs and other related hosts of the adult worm is now over due. The incidence of hydatidosis in the animals slaughtered for human consumption and other animal hosts has also to be investigated. Observations on the epidemiological patterns of the disease (epidemiological conditions responsible for the spread and maintenance of the disease) have not yet been systematically made. Time is ripe that data on the prevalence of the disease in various districts of West Pakistan are carefully collected. The co-relation of the disease and the socio-economic conditions of the people involved and the mode of life of the communities also need study.

The dog and related animals are known to be important definitive hosts of this infection. Circumstances under which the disease travels from the carrier associate, however, is to be carefully checked.

The morphology of the strain of Echinococcus found in our indigenous dogs has not been studied thoroughly. Sondhi (1923, however, initiated such a study, but due to certain unavoidable circumstances, he did not pursue this work beyond a preliminary stage.

In West Pakistan, classical pet dogs are rarely found. Most of us do not need dogs in our houses. Keeping of dogs is an expensive affair. The country, however, has a good population of pariah dogs both in villages and towns. The stray dogs are no man's responsibility and usually flourish on what drops from the dinner table, or thrown to them out of kindness. Some, however, subsist on the manure pits. It is all hazardous both to man and dog.

One of the important conditions in the transmission of the disease to man is the degree of "dog to man" contact. The rate of infection is more or less directly proportional to living together with dogs and degree of infection in the canine associate. Closer contacts are dangerous and may multiply chances of Hydatid disease in man. Most of the infections probably occur in the suburbs of big cities. Chances also increase in the under-developed parts of the country, where people keep and raise cattle and sheep in pastures and are obliged to keep dogs for the protection of their herds. Although we have no data yet it is assumed that the stray and pet dogs efficiently keep on moving infections from cattle to man.

Recently some parasitological investigations were carried out on street dogs of Lahore and it was found that about 25 per cent of the dogs harboured Echinococcus worms. According to a conservative estimate the population of stray dogs is substantial in the country. This information poses warning of the collosal danger involved from stray dogs.

The prime source of infection in dogs is morbid waste material thrown promiscuously from the abattoirs. In the City of Lahore, there are four abattoirs (one for beef and three for mutton). Judging from the international standards the working conditions of

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these abattoirs are not quite satisfactory. Most of the city population of vultures, crows and dogs may be observed clustering around these abattoirs and feeding upon the waste offal thrown away indiscriminately.

The butcher shops usually have no proper arrangements for the disposal of offal waste. They throw out all the scrapings and waste in the street, which is picked up either by the kites or the dogs ever waiting to pounce.

The carcasses of dead animals in this country are also not properly disposed off. Frequently one may find dead bodies of cattle and other animals decaying here and there and every where in the fields. One may watch the vultures feasting desperately. The dogs also feed with a insane furry. The crows also do not lag behind in obtaining the free meals. The carcasses of diseased animals are known for the to and fro movement not only of parasites but also of pathogenic organisms.

According to the present day Veterinary Public Health Standards, adequate Medical check up of cattle brought to the slaughter houses is an obligation. At present the number of Veterinary Inspectors entrusted this work is not enough. Their training to supervise and make spot checks for diseased carcasses and organs is not adequate.

There is only one Veterinary Surgeon who makes ante-mortem and post-mortem examinations at the abattoirs in Lahore and ensures suitability of the animals offered for slaughtering. According to the international standards, it appears humanly impossible for one Veterinary Surgeon to conduct ante-mortem and post -mortem observations of several thousands of animals slaughtered daily in Lahore alone.

The state of affairs in Tehsil headquarters is probably more deplorable. There the Assistant Veterinary Surgeon is more heavily worked and cannot be expected to do any justice to the additional abattoir duties. The duties at the abattoirs are definitely of whole time nature warranting serious notice.

Healthy food is essential for raising a healthy nation. Employment of sufficient staff of veterinary surgeons to supervise slaughtering of cattle and making spot checks for the diseased carcasses and organs is more than justified. To safe-guard dispersal of parasite, destruction and proper disposal of morbid carcasses needs to be properly organised and supervised by a competent person.

In the villages the meat requirements are low and we have, therefore, no rural abattoirs. The cattle are slaughtered on individual basis and subject to demands of the locality and some adjoining areas. Here, like elsewhere, the waste material is promiscuously disposed off for the consumption of scavengers viz., the dog, the crows and the kites. The vultures generally consume the carcass of animals dying a natural death.

PREVALENCE OF HYDATID DISEASE IN MAN

With a view to obtain vivid picture of the problem of hydatidosis in the country, an attempt was made to obtain records from various hospitals of West Pakistan. Response is, that in spite of hectic efforts a complete record of cases operated for the hydatid cysts in various hospitals of the Province was not made available to us. All the Medical Superintendents of District Headquarters Hospitals and the Administrators in Medical Colleges of the Province were requested to furnish relevant information. These circular letters and reminders fetch us data from 29 out of 52 districts only.

Larger proportion of people, particularly those belonging to rural areas, are not fully awake to medical facilities. Even a disease does not force them to see a Doctor or visit a hospital. A Hakim, or a 'vaid', however, is regularly consulted.

The laboratory facilities for the diagnosis of the hydatid disease are not available at most of the district headquarter hospitals. One has to rely only on the history of the case or on the clinical signs and symptoms, if any. Since the disease remains usually

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asymptomatic, except sometimes at an advanced stage with the swelling of the part or some symptoms due to pressure effects and so it is seen that most of the cases do not come to the hospitals for treatment. The case is usually diagnosed accidentally at these hospitals during operation or sometimes one realises the diagnosis when one aspirates which, though not advisable results from misdiagnosis. Or, otherwise, the cyst remains latent throughout life and the person harbouring the cyst, moves about and performs his daily activities without ever noticing the symptoms. Apparently a large proportion of hydatid cases do not come to limelight. The data present in this note does not, therefore, represent the actual number of cases occuring in the Province. One. therefore, is forced to conclude that the figures available do not give a true indication of the incidence of hydatid disease in any one district. With this meagre information one cannot vouch safe if the disease is several times higher than the cases operated for hydatid cysts in the province or are alarmingly high or low.

The records presented in this note are for the years 1958—64. The number denotes the cases operated in various district hospitals. This record does not include figures from any of the hospitals of Karachi, Lahore, Peshawar, Multan and Hyderabad or the hospitals attached to the medical colleges, except Sir Ganga Ram Hospital (Fatima Jinnah Medical College, Lahore). information concerning the hydatid cases, operated upon in three surgical units of the Mayo Hospital, Lahore, is given separately as it does not pertain to the same period.

No case of hydatid disease was operated upon in Gujranwala, Sheikhupura, Murree, Rawalpindi, Peshawar, Zhob, Pishin, Montgomery, Thatta, Sanghar and Dadu hospitals.

Observations—During a period of six years (1958—64) some 90 cases were operated upon for hydatid cysts in various district hospitals. This included 57 females of different age groups constituting 63·3% of the total and 33 males of different age groups which is 36·6% of the total.

No case operated upon for hydatid cysts belonged to pre-school age group i.e. 0-5 years. 6·6 per cent of the total operated cases of hydatid cysts (6 cases) were in 6—15 years of age group (school going period). 75 cases (83·3%) were in the age group of 16—45 years. While only 8·8 per cent cases (8 cases) occured in the advance age group of 46—60 years. Hydatid disease has been found rare in elder age group. Only one case (1·1%) was found to be in the age group 61 and over (Table II).

Young age group females are seldom operated for hydatid cysts. Only 7·0 per cent of the total females operated were from the age group of 6-15 years. Highest incidence, however, occurred in the age group 16—45 years (49 cases 85·8%). Only 5·2 per cent cases belonged to the age group 46—60 years the incidence in above 61 years of age group does not exceed 1·7 per cent (Table II).

Male cases in the age group 6—15 years were 2, forming 6·0% of the total male cases. 26(78.7%) males were from the age group of 16-45 years. Only 5 (15·1%) cases occurred in the age group of 46—60 years. No male of 61 years of age or over was ever operated for the hydatid cysts in the districts under review (Table II).

Seat of Predilection

For 28 cases, the seat of operation was not available, and therefore, seat of predilection could not be ascertained. A perusal of Table I, will show that in 24 (38. 7%) cases, the cysts occurred in the liver; in 1 (1·6%) case in the peritoneal cavity; in 3 (4·8%) cases in the intestine ; in 1 (1. 6 %) case in the mesentery; in 1 (1. 6%) case in the kidney; in 24 (38·7%) cases other abdominal sites including the abdominal wall; in 1(1·6%) case the breast ; in 1(1·6%) case the neck region; in 2(3·2%) cases the axilla; in 3(4·8%) cases the thigh bone; in 1(1·6%) case the hamstring muscle and in one case it occurred in the spleen in addition to the liver.

Obviously the information available gives an impression that liver (38·7 per cent) the more common site of the occurrence of hydatid cysts in man while the lungs and

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different abdominal sites come next in importance. The bones, muscles, etc. however are of very minor significance.

The information from Mayo Hospital, Lahore, was given in a symposium on hydatid disease held at Mayo Hospital, on 29th January 1966. Although this data is not complete yet it gives an indication of the gereral prevalence of the disease. Mayo Hospital is the oldest and the biggest institution of its kind in the province and provides treatment facilities to the largest number of people. The information given here is a glimpse of surgical records of three surgical units where 140 hydatid cases were operated upon during 1947—65.

Sex-wise break up of 40 cases operated in one of the surgical units was not available. Out of the rest, however, 53 were males and 47 females.

In 60 cases (42·8%) the site of operation was liver as against 49 (35%) in which the lungs were involved. The seat of predilection were peritioneum in 10(7.1%) cases; spleen in 8 (5·7%) cases; kindey in 1(0·7%) case; ovary in 1(0·7%)case; caecum and colon in (4·2%) cases; urinary bladder in 1(0·7%) case; pancreas in 1(0.7%) case; muscles in (0·7%) case and breast in 2(1·4%) cases.

In one of the surgical units, 40 cases of hydatid lung were operated upon during 60—65, while in another 50 cases were operated during 1958—65 as against 50 cases operated upon in the third surgical unit during 1947—65 (Table III).

District-wise Distribution

One may surmise from a perusal of Table I that the disease is probably most prevalent in D.G. Khan district where the main source of livelihood for the local population is breeding and raising sheep and goats. This district at present is the main supplier of animals for mutton meat in West Pakistan. The breeders keep watch dogs for the protection of their herds.

Fairly high incidence of hydatid disease also occurs in certain other districts of the Upper Punjab, *e.g.*, Sargodha, Jhang, Lyallpur, Muzaffargarh. The higher incidence is apparently because these districts harbour major part of the cattle wealth of West Pakistan. Obviously one may also indirectly conclude that cattle and sheep breeding and the hydatid disease in man are fairly closely inter-related.

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DETAILS OF SURGICAL CASES OPERATED UPON FOR HYDATID CYSTS IN THE MAYO HOSPITAL, LAHORE

Surgical Unit	Period	Total Operated	M	F	Liver	Lung	Peritoneum	Spleen	Kidney	Ovary	Caecum and colon	Urinary bladder	Pancreas	Muscles	Breast
1	1960—65 ..	40	..	..	..	40	..	..	..	..	..	..	..	..	..
2	1958—65 ..	50	26	24	26	4	8	5	1	1	2	1	1	1	..
3	1947—65 ..	50	27	23	34	5	2	3	..	..	4	..	..	..	2
Total ..	1947—65 ..	140	53	47	60	49	10	8	1	1	6	1	1	1	2
Percentage	..	..	..	..	42·8	35	7·1	5·7	0·7	0·7	4·2	0·7	0·7	0·7	1·4

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PREVALENCE OF ECHINOCOCCUS IN DOGS

Parasitological investigations of stray dogs in Lahore were carried out during period of four months from September to December 1963. During this period eight stray dogs were dissected and thoroughly searched for parasitic worms, *Echinococcus* in particular, in the alimentary tract. Due to very small size of the worm the light infections likely to be missed. Only two dogs (25 per cent) were found harbouring *Echinococcus* adults.

TABLE IV

INCIDENCE OF E. GRANULOSUS IN MONGREL DOGS OF LAHORE CITY

Total No. of dogs autopsied	No. positive for *E. granulosus*	Total No. of *E. granulosus* found on autopsy	Average number per dog	Percentage of dogs found infected
8	2	57	28·5	25

DISCUSSION

Various hospitals of West Pakistan during a period of six years from 1858 operated upon 90 cases of hydatid cysts. The Mayo Hospital, Lahore on the other hand operated upon 140 cases in a long span of 19 years from 1947 to 1965. These figures are too meagre to give a true index of the prevalence of this disease in the province. Obviously the record is incomplete as it does not include many of the hospitals particularly those in larger cities like Lahore or Karachi which actually attract a larger proportion of such cases for treatment. Cases which need surgical treatment usually choose larger and better equipped hospitals where well reputed surgeons are available. Moreover, many patients hesitate to undergo surgical treatment and are not recorded. The proportion of hydatid patients who never visit hospitals must also be very large. It will, therefore, be not wrong to presume that the disease is probably more common than what the data available may show. The present position warrants a conscientious work and conserted efforts to tackle this public health problem.

With a view to assess the prevalence of this disease in man a well organised survey should be planned immediately. Laboratory, investigations, including blood tests, casoni's tests, compliment fixation tests and precipit in tests should be carried out in a good cross section of the population apparently exposed to the infection. In a rural population, where the dog and man relationship is more real and living conditions are most unhygienic such a fact finding project will provide useful information. The chain of infection is very closely associated especially in such places where the sheep and goat herds are kept together with the dog and man remains in the same environment to safeguard these animals. A close contact facilitate quick dissemination of the disease.

All efforts have to be made to break this chain by taking appropriate measures. Although it is not considered feasible, yet efforts should be made to find out infected dogs. Stray dogs are a great nuisance and dog destruction campaigns have to be well organised. The disposal of carcasses of sheep, goats or cattle, either dying of this disease or others have to be properly organised and infection of scavengers in general and dogs in particular have to be stopped.

It is possible to control or even eradicate this disease by undertaking necessary measures. It may be suggested in this connection that strict measures be undertaken to check and destroy all hydatid diseased carcasses or at least the affected parts and such carcasses should be allowed to leave the abattoirs. The sheep, goats, cattle when

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f some disease should be disposed off in such a way that the dogs may not be able to gain cess to the decaying carcass. Secondly, attention should also be paid to the mongrel ogs which are directly concerned with the transmission of hydatid infection to man. he dogs, the chief source of infection to man, are closely associated with human habitaons. This animal can easily get its food in some form or another for sustaining its life herever there is human population. It may be suggested that the dog population, hich is always a nuisance otherwise, be reduced to as low a level as possible. Perhaps his is the easiest and most effective way to overcome this nasty disease.

SUMMARY

Epidemiological pattern of hydatid disease is briefly discussed. This is a serious elminthic disease in West Pakistan as is obvious from the data given in the paper which hows 90 hydatid cases operated in different District Headquarter, Hospitals and in ddition 140 cases operated in Mayo Hospital, Lahore, alone. These figures give an incomplete image of affairs but cast a glimpse of the prevalence of this disease in the rovince.

Two out of eight mongrel dogs dissected were found harbouring *Echinococcus* orms. It is a heavy rate of infection and warrants more thorough investigations.

The detection of a large number of those cases which are never reported to the hospitals need also to be found out with precision.

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BIBLIOGRAPHY

1. Amirud Din (1966), Hydatid Disease in Man. *The King Edward Medical College Union Gazette.*, 10 (1) : 23—29.

2. Babero, B. B., Al-Dabagh, M. A., Al-Saffar, A.S., and Ali, F. M. (1963). The oonosis of animal parasites in Iraq. VIII; Hydatid disease. *Ann. Trop. Med. Parasit* 57 (4) : 499-510.

3. Cook, B.R. (1964). The Epidemiology of *Echinococcus* infection in Great Britain. II : The incidence of *Echinococcus granulosus* and some other cestodes in farm dogs in mid-Wales. *Ann. Trop. Med. Parasit,* 58 (2) : 147—152..

4. Cook, B.R., and Crewe, W. (1963). The epidemiology of *Echinococcus* infection in Great Britain. I : Abnormal behaviour of sheep in the mining valleys of South Wales and its relation to hydatid disease in man. *Ann. Trop. Med. Parasit,* 57 (2); 150—156.

5. Nelson, G. S., and Rausch, R.L. (1963). *Echinococcus* infection in man and animals in Kenya. *Ann. Trop. Med. Parasit,* 57 (2) : 136—149.

6. Rausch, R. L., and Nelson, G. S. (1963). A review of the genus *Echinococcus* Rudolphi, 1801. *Ann. Trop. Med. Parasit,* 57 (2); 127—135.

7. Sarojam K. Mankau (1956). Studies on *Echinococcus alveolaris* (Klemin, 1883), from St. Lawrence Island, Alaska III. The histopathology caused by the infection of *E. alveolaris* in white mice. *Amer. Jour. Trop. Med. Hyg.*, 5 (5); 872—880.

8. Sondhi, G. (1923). Tape worm parasites of dogs in the Punjab. *Parasitology* Vol. 15; 59—66.

9 Sweatman, G. K. (1964). The significance of the artificial introduction of reindeer (*Rangifer tarandus*) and moose (*Alcesalces*) in the spread of hydatid disease (*Echinococcus granulosus*). *Ann. Trop. Med. Parasit.*, 58 (3) : 307—314.

10. Wolfgang R. W., and Poole J. B. (1956). Distribution of *Echinococcus* disease in North Western Canada. *Amer. Jour. Trop. Med. Hyg.*, 5 : (5) ; 869—871.

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ZOONOSES : PROBLEMS WITH SPECIAL REFERENCE TO DOG (*CANIS FAMILIARIS* Linnaeus)

BY

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I—Introduction

The little dogs and

Tray, Blanch and Sweet-Heart, see they all bark at
(Shakespea

The man struggled, since time immemorial, against all forces for his exista During these contests, a variety of relationships with animals, found advantageous to were established.

The early man depended upon different animals for his supplementary food supp He also hunted animals for the protection of his body by the skin of his prey. Some ani followed him to live on what he left over. With passage of time the relationship g closer, more intimate and extra stronger and gave room to new adjustme Domestication was another attempt to streamline the well-webbed existance.

Although man and animal association originated from mutual advantages, yet disasterous effect of the association was that the man also acquired their parasites diseases freely. There occurred an unexpected implication of this most obvious to fro passage of the unwanted stuff. The exchange of some organisms, lead to st strain, tension and crises. Thanks to the researches of various workers, the why and of the parasites and diseases are now known and simple ways to control and prevent ultimately eradicate them are available.

The dreadful diseases of man, which can be traced back to the wild and comme animals, may be grouped together. The modern parasitologists coined the term ZOONO for this category and define it as "*diseases which are naturally transmitted between verte animals and man.*"

According to a conservative estimation, there are 80—90 major infections of commensal and domesticated mammals and birds which are transferable to man. Ta the minor ones into consideration, this number may rise to 150 or more. Hereafter, a discussion of the diseases transmitted from the dog to the man is presented.

II—The Dog

The dog is one of the most popular animals. So familiar that all animal toys t three years old cousin Farah Nafis Ansari are dogs. In general sense, it belong the zoological genus CANIS. It is one of the best known pets for its fidelity, but is notorious source of infection for some dreadful diseases of man. Because of this ha the muslims do not closely associate themselves with it. The general impression is it is an unpious animal antagonistic to Gods choicest blessings and should, therefore, to be allowed in the houses "*Truth has now arrived and falsehood perished Falsehood is bound to perish.*"

(Al Quran, 17—81)

It is a matter of great wonderment, that God, the Great and Merciful, made it to the believers what to fear and what to avoid. The Kind and the Bountiful inform of the true state of affairs and warned us of the dangers well in time. This guidance pires faith. It is a matter of rejoicing that we were made aware of the dangers fou hundred years before, when our scientific knowledge was in embryonic stages and belief was just a bundle of myths and mythologies and everything rotated be gods and demons or was an astrological constellations or was a punishment from he The gesture of fore warning is God's revelation of Mercy. The warning against w

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a symbol of God's bounty, it is a promise of salvation and blessing to the righteous. God knows what is hidden and what is open. God is all knowing, all wise, most kind and most merciful. It is an invitation to serve God whole heartedly. Unlike muslims of the East, the dog is an important part of the household in the West. It is one of the constant companions of all age groups. There, the children fondle dogs generously, the young pat and kiss them with special privileges and the elders bestow caresses upon them freely and liberally.

From the oldest records available from the caves, it appears that man and dog relationship was well-established since more than 50 thousand years. When the medieval man resorted to storage of food, he courted the scavangers to move to his cave. His hunting habit and storage of the meat attracted the dog-like predatory animals. Factors of safety, protective environments and food guarantee were obvious advantages to the dogs in the cave. The opportunists, preferred to live on bones and sleep in peace outside the door way. Obtaining of nourishment from the remains of the animals, the man hunted, was better suited than preying.

In his own interest, the dog learnt to bark on intruders, scorn and grin on trespassers. It kept away the competitors, disallowed encroachments but wagged tail when owner of the cave was sighted. It courted love, became dear and near. In exchange of the facilities it obtained in the cave, it became good friend, reliable companion and dependable watch and ward. But alas, this close association also helped to and fro movement of some dreadful diseases. Some of these diseases caused much catastrophe and fantastic hallucination.

III—The Dog's Diseases

The dog diseases of public health significance, tabulated jointly by W.H.O. and F.A.O. for convenience of discussion, may be grouped according to the causative organisms. There are seven such groups, *viz.* (1) Viral diseases; (2) Rickettsial diseases; (3) Bacterial diseases; (4) Fungal diseases; (5) Protozoal diseases; (6) Helminthic diseases and (7) Arthropodal diseases.

3·1 **Viral Diseases**—Viruses are minute organisms, smallest of all the disease-causing agents. The size is ultramicroscopic ranging from 10 mu to 400 mu, and of extremely complex chemical composition. Mostly believed to be auto-catalytic bodies. Nature of filterable viruses is still disputable. Some viruses are very strictly host-specific, while others know no barriers. Viruses usually spread by contact, by air-borne droplets or by arthropod vectors.

3·1·1. *Rabies or Hydrophobia*—Is an active, rapidly fatal virus infection of central nervous system. It is highly specific and primarily a disease of animals. The disease is transmitted from a rabid animal to a susceptible animal through a wound. In man it is transmitted by a bite of an infected animal, commonly a dog and a jackal. The vampires, large blood-sucking bats of South America have also been incriminated in the transmission of rabies.

For successful transmission, the infective saliva or other alimentary secretions must be brought in contact with nerve tissues of a second host.

Characteristic symptom in lower animals is excessive appetite. The animal bites at anything and everything from paper to plank, from stick to style and from leather to lead. It may chew and swallow earth. This stage succeeded by one of intense excitement and restlessness. The state of excitement lasts for a day or so, passing into a partial or complete paralysis and terminating by death. During the stage of excitement, the animal may run about and cover a distance of 18—40 miles.

This disease takes a similar course in man. Towards the end, there are symptoms of paralysis, responsible for noisy respiration and ultimately death occurs.

Incubation period may vary from 10—210 days. In man, on an average the symptoms may develop in about 42 days. A normal dog, when bitten by a rabbid dog, may develop symptoms within 10—60 days. It is shorter in young age groups and longer in adults.

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Immediate cauterization of the wound may give good results. Anti-rabic treatment well before appearance of symptoms is the only treatment available. Rabies may be checked and even eliminated by measures directed against dogs.

3· 1·2. *Lymphocytic Choriomeningitis* has been shown to be transmissible by *Trichinella* larvae. The onset of symptoms is sudden, with respiratory and constitutional disturbances, similar to those of influenza. Later headache, vomiting, stiffness of neck and photophobia may appear. Mice are the natural reservoires. Transmission from mice to man and dog may occur through dust.; Human food may also be contaminated. *Aedes aegypti* may also transmit this virus (exper mental infection).

3·2. **Rickettsial Diseases**—Rickettsiae are spherical or rod-shaped micro-organisms resembling bacteria, and intermediate to bacteria and viruses in size. Originally are the parasites of arthropods. Their development occurs in cells. Rocky mountain spotted fever, typhus fever, scrub typhus are some of the rickettsial diseases.

3· 2·1. *Rocky Mountain Spotted Fever* is a specific infectious disease caused by *R. rickettsi*. Wood tick (*Dermacentor andersoni*) and dog tick (*D. variabilis*) are important vectors in United States. Dogs and field mice are responsible in the transmission of the disease to man. The disease is more frequent in childern than in adults.

The disease characterized by a muscular eruption, with irritability and hyperesthesia of the skin, enlargement of spleen and catarrh of respiratory tract. The urine may contain albumin and casts.

Proper campaigns against ticks should be planned where the disease is endemic. Repellents like indalone, dimethylphthalate and Rutgers are also good for field workers. Rotational grazing system may give relief. Destruction of wild hosts may help eradication. "Keeping away of the susceptibles" from the tick-breeding fields may work well. Burning of scrub areas may help in the destruction of tick-shelters and drive away its wild hosts. Cultivation of fields, tends to reduce tick population. Suitable insecticides may be used both as sprays and dips. Five per cent phenol emulsion of infected ticks may immunise both man and his pets against the rickettsial diseases.

3· 2·2. *Boutonneuse Fever* is a mild typhus like fever. It is endemic in Tunis and North Africa. The common brown dog tick(*Rhipicephalus sanguineus*) is the vector. This disease is suspected to have wide geographical distribution. The vectors principally occur in tropical and sub-tropical climates.

3·3. **Bacterial Diseases**—The dog may be involved in the transmission of Leptospirosis, Shigellosis and Tuberculosis.

3· 3·1. *Leptospirosis*—There are a number of *Leptospira* species, which have been named and implicated as infectious and causing haemorrhagic jaundice type of diseases. These are acute fibril diseases, occurring endemically or occasionally epidemically in many parts of the world.

Leptospirosis is characterised by sudden onset with chills and fevers, prostration and muscular pains. Four or five days after jaundice appears and papular rashes occur In several cases bleeding from mucous may be sighted. Incubation period varies from 4—14 days.

The infection may either enter through mouth or the skin. Evidently the mine workers contract Leptospiras through the intact or abraded skin. Cases are more common in wet mines. Marshy and muddy soil is dangerous in endemic areas. Water-supply and insanitary bathing places usually get contaminated from the reservoir host. Leptospirosis is primarily a disease of dogs, rodents and cattle. Man is frequently infected by contact with these animals. The dog is an important contaminator of human food and water.

3· 3·2. *Shigellosis* is occurring in man since time immemorial. According to some workers, the majority of the clinical illnesses, classified as acute diarrhoeas, are asso-

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ished with Shigella group of organisms. According to severity of the disease and virulence of the strain, the group may cause true dysentery, para dysentery and mata dysentery.

Human faeces containing *Shigella*, transmit it from one person to the other. The contaminated food-stuff and water supply are common vehicles of transmission. Carriers, who handle food supplies, are also important in this regard.

The bacilli causing dysentery in man, have also been found in spontaneous dysentery of dogs and some other animals and causing intestinal lesions identical to human dysentery. It is highly probable that dogs and rabbits, which suffer from spontaneous dysentery, are also important carriers of this disease. Such animals may freely contaminate water supply and play significant role in the spread of epidemics.

3. 3·3. *Tuberculosis* is one of the rare diseases of dog. Whenever it occurs, the infection may be traced back both to the organisms involved in human and bovine tuberculosis. In ailing dogs, the tubercules may be found in pleaura, pericardium and liver.

Although the dog is highly resistant to tuberculosis, yet the natural resistant in it may remarkably diminish due to constant loss of insuline rather than due to loss of digestive enzymes of the pancreas.

3·4. **Fungal Diseases**—There are a number of fungal diseases common to man and other animals. The known vectors are stray dogs, cat, infected cattle and rodents.

3· 4·1. *Blastomycosis* has been found a natural infection in dogs. In man this infection occurs from fomites.

3· 4·2. *Coccidiomycosis* is a systemic mycosis. It is found naturally in cattle, sheep and dog. Rodents are probably important reservoirs of infection. Man acquires the infection from extraneous sources. The infection from the soil is carried by the dust-raising winds to the man.

3. 4·3. *Cryptococcosis* is caused by a yeast like a fungus. The naturally acquired disease occurs in horse, rat, mouse, dog, cat and several other animals. It is widely distributed but is sporadic disease of man.

3. 4·4. *Ring Worm* infections are most important to public health. This includes microsporium diseases of dog, cat and other domestic animals. It is an infection of skin and does not extend its nefarious activities beyond its growing point. In man it causes ring worm and a severe kind of dermatitis. It may occur in all age groups but is more common in children firstly because they fondle pet dogs more intimately and secondly because their skin is soft and more susceptible to the on slaughts of fungus.

The inconvenience caused to the victims warrants an immediate attention and careful investigation both by public health workers, skin specialists and medical mycologists.

3·5. **Portozoal Diseases**—The protozoas occur both as parasites and commensals in man. The pathogenic forms are transmitted either through food or water. A few may also be conveyed through a vector. The dog may play important role in the transmission of some. The following parasitic forms are of public health importance.

3· 5·1. *Amoebic Dysentery* is caused when endo-parasitic ameba (*Entamoeba histolytica*) invades the alimentary tract of man. This pathogenic amoeba has been recorded from almost all parts of the world. It is more common in tropics and sub-tropical parts of the world. It is the poor sanitation rather than favourable climate which facilitate prevalence of amebic dysentery.

Man is the principal host of *E. histolytica*. Monkeys, rats, dogs and pigs have been found infected in nature. Infections, under laboratory conditions may be found established

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in several other animals. Puppies and kittens are more easily infected. Laboratory infections may occur both by feeding and rectal passage of human faeces containing trophozoites or cyst of the parasite. According to consensus of opinion, these animals may play very minor role in the transmission of the disease. Most of the cases usually occur from human cases. Contaminated foods and drinks with cyst ladden faeces are common sources of infection to man.

3· 5·2. *Leishmaniasis* is caused by three species of tissue invading flagellates. The three species are morphologically identical but produce three relatively distinct clinical pictures in man.

3· 5·2. 1. *L. tropica* is a parasite of skin and is found in endotheleal cells of infectious areas and causes cutaneous leishmaniasis (oriental sore) in man. It is endemic in Africa, part of Latin America, Asia and Europe. Sandflies are its natural vactors. *Phlebotomus papatasii* is important in Western India including West Pakistan, Afghanistan, Medeterranian region, Ethoipia and French, West Africa. In Iran, Iraq, Crete, Portugal, Algeria, Israel, Lebanon, Syria, Turkey, Greece and Jugoslavia. *P. sergenti* is the vector. *P. caucasicus*, *P. intermedius*, *P. perfilieri* and *P. perniciosus* have been incriminated from other places. *L. tropica* may also be transmitted mechanically by the biting flies viz., dog-flies and stable-flies from open ulcers.

Oriental sore also occurs in dogs in Iran, Iraq, Turkistan, Bombay, North Africa. Natural infection has also been recorded in cats, cattle and gerbils.

Infections in dog, cat and monkey may be conveniently established under laboratory conditions.

3· 5·2. 2. *L. braziliensis* causes espundia (cutaneous mucocutaneous leishmaniasis) in America. The disease is usually present in hot and humid forest areas. Maximum cases, however, occur up to 2500 feet above sea level. A strain may also occur at an elevation of 3,600 feet to 9,000 feet

The American leishmaniasis is more common from Guetemala to Northern Argentina and Paraguay. *P. evansi* (Venezuela), *P. fischeri* (Brazil, expt.), *P. intermedius*, *P. migonei* (Venezuela and in highly endemic areas of Brazil), *P. parasinensis* (Venezuela), *P. peruensis* (Peru), *P. pessoai* (in highly endemic areas of Brazil), *P. suis* (Venezuela) *P. verrucarum* (Peru) and *P. whitmani* (in highly endemic areas of Brazil) have been found infected both in nature and under laboratory conditions.

Natural infection occurs in dogs and cats. Successful artificial infection was established in several species of North American squirrels. The rhesus monkeys are also susceptible to espundia, while the hamsters are refractory.

Persons, who frequent forests or are associated with rural areas, notorious for the sand flies, should apply repellents to the exposed skins. Dimethylphthalate has been found effective. Direct contact with the victims should be avoided. Vaccination of susceptible individuals and persistent treatment of infected persons may give good relief.

3. 5·2· 3. *Leishmania donovani* causes Visceral leishmaniasis (Kala-azar) in man. The Kala-azar is widely distributed in parts of America, Africa, Asia and Europe. It is extensively distributed in eastern India and east Pakistan and has also been recorded from Iran, Iraq, Transjordan, Syria, Lebanon, Israel, Yaman and Saudi Arabia. In Indo-Pakistan subcontinent, its life cycle swings from man to sand fly and to man. In China, mediterranean countries and Brazil the infection however rotates from dog to sand fly to dog and dog to sand fly to man. In Brazil, different species of foxes are reservoirs of infection. In U.S.S.R. jackals also have been incriminated.

In dog, the lesions are primarily cutaneous and therefore, the animal is of great epidemiological importance. The *Phlebotomus* flies are important vectors. *P.*

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argentipes is important in Asia (East Pakistan, Eastern India, China, Tashkent and Transcaucasus). *P. Chinensis* has been playing vector role in endemic areas of Asia (given above) and Europe (Greece, Cyprus, Italy, Corsica, France, Spain Malta and Portugal). *P. intermedius* has been incriminated in South America, (Brazi Venezuela, Argentina, Paraguay and Bolivia). *P. longicuspis* occurs in Sudan, Ethiopia, North Kenya, Somaliland, Tripoli, Morocco Algeria and Tunisia. *P. longipalpis* is proven vector in Brazil, Venezuela, Argentiana, Paraguay and Bolivia. *P. major* has been found suitable sand fly in Greece, Cyprus, Italy, Corsica, France, Spain, Malta and Portugal. *P. orientalis* is a favourable transmitter in Sudan, Ethiopia, North Kenya, Somaliland, Tripoli, Morocco, Algeria and Tunisia. *P. panamanasis* communicates in Branzil, Venezuela, Argentina, Praguay and Bolivia. *P. papatasi* is familiar sand fly in Middle East (Turkey, Israel, Lebanon, Syria, Jordan, Saudi Arabia, Iran and U.S.S.R.) and in Europe (Greece, Cyprus, Italy, Corsica, France, Spain, Malta and Portugal). *P. perfilievi* is vehicle of transmission in Europe (Greece, Cyprus, Italy, Corsica, France, Spain, Malta and Portugal) and Middle East (Turkey, Israel, Syria, Jordan, Saudi Arabia, Iran and U. S. S. R.). *P. perniciosus* plays important role in Africa (Sudan, Ethiopia, North Kenya, Somaliland, Tripoli, Morocco, Algeria and Tunisia) and Europe (Greece, Cyprus, italy, Corsica, France, Spain, Malta and Portugal). *P. sergenti* occurs in Asia (East Pakistan, Eastern India, China, Transcaucacus and Taskhkent) and Africa (Sudan, Ethiopia, North Kenya, Somaliland, Tripoli, Morocco, Algeria and Tunisia). *P. tobbi* is found in Europe (Greece, Cyprus, Italy, Corsica, France, Spain, Malta and Portugal).

Natural infection has been found in dogs and cats in China, Mediterranian countries and Brazil. Investigations on the wild reservoirs are still being carried out.

Although blocked sand flies transmit the disease as a matter of routine yet ingestion of food and drink, contaminated with *L. donovani*, may also do tremendous harm. Kala-azar patients pass the flagellates in their faeces and urine. The flagellates also occur in the nasal secretions of the patients. Possibility of transmission through drop-let infection is also apparent. Normal hamsters, when fed on infected spleen or liver, may also develop the disease.

Prevention of the disease consist in the treatment of all human cases harbouring the parasite. Destruction of stray dogs and restricting their movement may also check the spread. Sandfly breeding grounds should be reduced to minimum. Reduce the fly menace by residual sprays and keep them away by the use of repellents. For door protection use finest mesh netting on your beds and keep your houses well-lit, well-ventilated, well-cleaned, and well-dried.

3. 5·3. *Typanosomiasis*. There are several species of a *Trypanosoma* found in blood stream and tissues of vertebrates. Some species are pathogenic to the vertebrate host while others are just like commensals to the natural host but are harmless to the invertebrates. *T. gambiense* (causing West African sleeping sickness), *T. rhodesiense* causings East-African sleeping sickness) and T. *cruzi* (causing South American trypanosomiasis) occur in man. Trypanosomas have two cycles of development. One cycle is passed in a mammalian host while the other in an arthropod.

The dogs, cats, armadillos, bats, ferrets, foxes, opossums, raccoons, ant-eaters, wild rats, squirrels, mouse and monkeys have been found reservoirs of *T. cruzi* infection. Rats, mice, guinea, pigs and lemers may be infected under laboratory conditions. Man is naturally infected in some parts of South America. Numerous species of Triatomid bugs (Reduvids) transmit *T. cruzi* from man to man. The bed-bugs and several species of hard and soft ticks (*Amblyomma* species, *Rhipicephalus* species: Ixodidae and *Ornithodorus* species: Argasidae) may be experimentally infected.

The usual method of transmission of *T. cruzi* (chagas disease) is contamination in faeces of the arthropods containing the metacyclic trypanosomes. The infective

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stage may be rubbed into the wound made by the bite of the kissing bug (*Triatom*
species). It is interesting to note that these arthropods continuously defaecate whi
feeding and increase chances for rubbing in or scratching into of the contaminant.

Destruction of triatomid bugs (cone nosed bugs) and protection from their bites m
give necessary prevention. Residual spraying with Dieldrin may reduce the populati
of assassin-bugs (*Triatoma* species). The domestic-bugs may be effectively controlled w
gammaxane (BCH). Destruction of reserviors of infection (dogs and cats) may not probal
help much in reducing the incidence of chagas disease in a community.

3·6. **Helminthic Diseases**—There are several species of helminths which due
climatic and other environmental conditions and human customs, infect man freely a
frequently. In some cases, the dog is directly or indirectly involved.

3·6·1. **Trematodan Parasites**—Man may harbour several species of tremato
Clonorchis sinensis, *Opisthorchis felineus*, *Heterophyes heterophyes*, *Paragoni*
watermani are some of the familiar trematods found both in man and dog.

3·6. 1·1. *Dicrocoelium dendriticum* is a widely distributed parasites of the
ducts of sheep, goat, ox, deer, pig, dog and donkey. In rare instances, man may also
involved. The infestation in man was recorded from Germany, Czechoslova
Switzerland, Italy, France, Egypt, Lebanon, Northern Africa, Belgiam Congo, Nige
Asiatic Russia, Java and China. Spurious cases occur after ingestion of sheep a
goat liver while natural infection may occur after ingesting an infective ant.It is co
monly distributed in Europe, Northern Africa, Northern Asia, Turkestan, parts of Far-E
North and South Americas and occurs in herbivores and omnivorous mammals.
eggs are ingested by land snails. Cercarias are liberated into stony-balls, left by
crawling snails on the grass blades. Meta cercarial cysts develop in an intermedi
host—ant. The definitive host gets infected after eating the ant. The cercarias penete
the intestinal wall of the final host, pass into the portal circulation and get into liver
ultimately reach bile ducts.

Human cases can be avoided if only well-cooked vegetables are eaten and inad
tantly putting of grasses in the mouth is abstained.

3.6.1.2. *Opisthorchis felineus* is a common fluke of man in North-Eastern Eu
and U. S. S. R. In recent times it has also been recorded from South Asia (India, Ja
and Indo-China) and Canada. The dog, cat, fox, pig and seals are infected in nat
Infections in the definitive hosts occur after ingestion of infected fresh-water fish.
parasite occurs in bile ducts and more rarely in pancreatic ducts and epigastric ly
nodes.

The faeces containing the eggs contaminate water collections containing the o
culated snails. The suitable snails, about two months after ingestion, begin to libe
cercarias. The cercarias attack the fish (second host) and develop into metacerca
When the infective fish is eaten by man and other reservoir hosts, the metacerca
excyst in the duodenum and migrate to the distal bile duct.

Avoid eating uncooked fish in endemic areas. Contamination of water with
ladden faeces should be stopped. It is however, most difficult to keep away hosts, o
than man, from the water collections and therefore, sanitary disposal of human
soil alone may not help much.

3.6.1.3. *Clonorchis sinensis* is found in Eastern Asia and is endemic in Ja
Korea and China. In additoin to man, dog, cat, pig and bedgers are its natural reserv
In some places the reservoir hosts are solely responsible for the perpetuation of infe
It occurs in bile ducts and sometimes in duodenum and pancreatic ducts. The inf
in the definitive host is established when raw or not well-cooked, dried, seasoned,

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and prickled fresh water fish is consumed. Metacercarias excyst in duodenum, make their way to biliary ducts. The fully embryonated eggs are discharged a month after, and passed in the faeces of the reservoirs host. Contaminated water, provides conditions for extrinsic development. Hatching occurs in the fresh water snails. The cercariae penetrate under the scales of the fresh water fish and encyst in its skin or flesh.

For the protection of the human population, consumption of uncooked fish should be prohibited in the endemic areas. Proper disposal of human faeces and protection of fish-breeding reservoirs from contamination may reduce infection rate in reservoir hosts.

3·6·1·4. *Pseudamphistomum truncatum* has been recorded from the bile ducts of dogs, cat, fox and seal. Infection in man has been seen in Europe and India. Its first intermediate host is not known for certain, probably it is a snail. The second intermediate hosts are various fresh water fishes. Our knowledge of this parasite is so far meagre.

3·6·1·5. *Fasciola hepatica* is cosmopolitan in its distribution. The adults live in the bile ducts of sheep, goat, ox and other ruminants. It has also been found in pig, hare, rabbit, beaver, elephant, horse and dog. Man may also acquire the infection in some places. Epidemics may occur in communities eating raw water cress in Latin America, France and Algeria. Primarily sheeps play major role in the propagation of this infection in nature.

The eggs, in an early stage of growth, are laid in proximal biliary passages and passed in faeces. Hatching occurs in water after 9—15 days. Within 8 hours after emergence, the miracidia invade snails. Four weeks after the cercarias are liberated in water and encyst either on the aquatic vegetation or float free in water.

Infection in mammals results after ingestion of the encysted metacercarias. Metacercarias excyst in the duodenum. Maturation occurs in biliary ducts. Human infection may also occur in blood vessels, lungs, subcutaneous tissues, brain and orbits. Newly-born kids and lambs may also have infection. Pharyngeal infection may occur when infected raw liver of sheep is eaten.

Eradicate the worm from the reservoir hosts. Adequate chemotherapeutic treatment of infected animals should be planned. Drainage of pasture lands and destruction of molluscan hosts may also help in the reduction of fascioliasis. Use of well-cooked liver prevents pharyngial fascioliasis.

3·6·1·6. *Fasciolopsis buski* is found in the South-Eastern parts of Asia. It has also been recorded from Assam and Bengal. It occurs in the small intestines of man, pig and dog. The other domestic animals are probably refractory.

Immature eggs are passed in faeces, become mature in seven weeks in fresh water, miracidium, on hatching, enter an appropriate intermediate host, commonly flat, spiral shelled snail. After a few weeks of development in them, the cercariae are liberated and encyst on aquatic vegetation *viz.*, seedpods of water caltrop, bulbs of water chestnut, water roots of lotus, water bamboo, etc. Man gets infection when he puts contaminated stuff in his mouth either for peeling off the hull or for eating. Excystation occurs in duodenum. Metacercarias hang on the intestinal wall and develop into adults.

Human faeces, containing immature eggs, when used to manure the water plants, cause the trouble. This practice should be stopped. Encourage use of fully composted manures. The people should also be educated to avoid putting raw tubers, nuts of water caltrop and water-chestnuts in the mouth. Snail killing campaigns should be organised in endemic areas.

3·6·1·7. *Echinostoma* species: There are about six *Echinostoma* species recorded from man. Human infection is acquired from the consumption of raw mol-

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lusks, tadpoles and fish. *E. malayanum* occurs in Malaya, Sumatra and India. The case, dog is normally exposed to the infection and man is an incidental host. The cause inflamatory lesions at the site of attachment to the intestines. Due to contin testinal irritation, the patient may complain of colic, and intermittent diarrhoea prevention is simple and consists of refraining from eating raw snails and fish. is the reservoir host.

3·6·1·8. *Heterophyes heterophyes* is of common occurrence in Nile Delta also been recorded from Japan, Southern area, Central and Southern China, Formo Phillipines. In addition to man, it has also been recorded from cat, dog, fox and fish eating animals.

Fully developed eggs are laid in the intestines. Hatching occurs when a snail eats them. Cercariae eventually emerge and infect the fresh water fish. finitive host ingests the infective fish and gets infected.

Prohibit eating of raw fish in endemic areas.

3·6·1·9. *Metagonimus yokogawai* was described from material collec dog and man. It has been recorded from the small intestines of cat and pig also most common in Far-East and Balkans. Has also been reported from Spain in m

The first intermediate host is a snail. The second intermediate hosts are fre fish. Final hosts are fish-eating mammals. Ingestion of raw fish provide mea fection in man. Water fowls, like Palicans, are also reservoirs of infection.

Prohibit eating of raw fish in endemic areas. Restrict chances of water and minimise carry over of the infection.

3·6·1·10. *Paragonimus westermani* occurs primarily in Far-East, includin Korea, Formosa, China, Manchuria, Indo-China, Phillipines, Thailand, Malaya Malabar, Madras Presidency and Assam. It has also been recorded from New Salomon Islands, Java, Sumatra, Samoa, Belgian, Congo, Nigeria, Peru, Columbia and Venezuela.

The oriental lung fluke, in addition to man, has been recorded from many o mals, *viz.*, cat, leopard, panther, fox, wolf, dog, pig, beaver, civet cat, mangoose, et animals acquire infection after eating infected crabs and cray-fish. The defin either coughs up the parasite in the sputum and expectorates or swallows and passe the intestines and finally liberates in the faeces. Fresh water sources are usual minated by the reservoir hosts and rarely by human cases. These eggs undergo ment in water for 16 days or more. Miracidia swims freely to a suitable mollu and within it produces a sporocyst and a redia generation. Free living cerca beration, swarm round the crabs and cray-fishes and invade their muscles and encyst as metacercariae. When the definitive and the reservoir hosts ingest and cray-fishes, metacercariae excyst in the duodenum and migrate to bronch circuitous rout. The worm may also get trapped in ectopic locations and reach mesentery, groin, pleura and brain.

Always eat adequately cooked, well-boiled, and properly fried crabs and Freshly salted, dipped in vinegar and wine-soaked delicacies do no harm to the therefore, are not safe in endemic areas.

3·6·1·11. *Schistosoma japonicum* is common in Far East-China. Phillipine islands. The adults occur in dogs, cats, rats, mice, cattle, pigs, d and buffaloes in nature. Use of human manure to fertilise garden crop chances for snail infection. The operculate amphibious snails, with elon shell, get infected after coming in contact with the actively moving

Cercariae are liberated 5-7 weeks after, when the snails are below water level. Mammals, which enter waters containing cercariae, get infected.

It is a disease of rice cultivators and boatmen. Bathing and wading in contaminated waters is dangerous. Floods in endemic areas distribute infected snails. Dust or spray effective molluscicides on vegetation or on soil haunted by the operculate amphibious snails. Use composted human manures as fertilisers. Promiscuous defaecation along irrigation ditches, canals, pools and shallow water ways should be prohibited. Educate the public to co-operate fully in a campaign directed against reservoir hosts or intermediate hosts ofthe fluke.

3·6·2. **Cestodan Parasites**—Man may harbour a dozen of tape-worms. Unlike flukes, the tape-worm infections are less limited. For some of them, man is primarily or exclusively definitive host while in others he is incidental. Tape-worms, with the exception of fish-tape-worm, seldom have a free living existence. In most cases, ingestion of raw and inadequately cooked infested meat of an intermediate host, is responsible for the human cases. Improper personal hygiene however, is the source of infection in others. In most of the known tape-worm infections of man, the portal of entery is mouth. Sanitary disposal of human and animal manure may lower the incidence of tape-worms in most cases. Eating strictly well-cooked beef, mutton, pork fish, shrimp, lobster, and cray fish may control some of the most common tape-worms of man. Contaminated water and polluted vegetables also play important role in the spread of some tape-worm infections. In the spread of following tape-worms, the dog may also come in the picture.

3·6·2·1. *Diphyllobothrium latum* occurs commonly in Northern Italy, Switzerland, parts of Germany, Baltic countries, Romania, Palestine, Siberia, Northern Manchuria, Japan, North America, Eastern Canada, Lake district of Chile and Argentina, Australia, Uganda, Angola, Madagascar, Papua and New Guinea. In addition to man, the fish-tape-worm has been found in dog, cat, leopard, mangoose, seal, sea-lions, foxes, bears and other fish eating mammals.

The man passes the eggs in the water collections. First infection take place in cyclops and copepods. The susceptible fish on feeding upon the copepods, containing procercoids, gives chance to the parasite to develop further. Man and other amimals get infected when a fish containing plerocercoid (sparganum larva) is consumed raw. The refrigerated fishes, exported from endemic areas to far flung areas, have played important role in the spread of diphillobothriasis from country to country.

Educate people to avoid contamination of water sources. Encourage thorough cooking of fresh water fishes in endemic areas before consumption. Proper treatment of sewage, before flowing into rivers, may give good results. Exporting of infected fish is a crime and should be legally stopped. Deworm the domestic animals periodically.

3·6·2·2. *Mesocestoides lineatus* was recorded from Kenya. This tape-worm occurs in small intestines of dog, cat, fox and wild carnivores. Accidentally, the infection may occur in man. The intermediate hosts are probably a coprophagous insect and a vertebrate.

3·6·2·3. *Dipylidium caninum* is of world wide distribution and commonly found in dog and cat and may also occur in the small intestines of fox, civet cat, hyena, jackal and man. The intermediate hosts of the worm are the larval stages of dog flea, cat flea and human flea. The dog louse is also a suitable host. The final host gets infected after ingesting the surviving adult fleas. Human cases usually occur in children, who fondle cats and dogs.

"*Pak Jour, Hlth.*, 16 (2)"

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Do not let your children play with dogs and [illegible] Keep the dog kennels [illegible] pet dogs. Kill fleas with DDT dusting of the animals. cat cots clean so that flea-breeding does not occur in the debris.

3·6·2·4. *Taenia solium* is an important human parasite and is of [illegible] distribution where raw and inadequately cooked pork is consumed. The cysticerc[illegible] stage is generally found in pigs but less frequently in man, sheep, dogs and cats [illegible] The ingested eggs pass on to the duodenum or jejunum where the oncosphere emer[illegible] and make their way through the intestinal wall to other parts of the body and filter[illegible] out between the muscles and ultimately in a course of 60—70 days transform into ovat[illegible] milky white bladder worm called *Cysticercus cellulosae*.

Man is only definitive host but in some cases it is also an intermediate host.

Man may ingest eggs in contaminated food and water. Polluted fingers ma[illegible] also carry eggs to the mouth in those who have adult worm in their intestine[illegible] Internal auto-infection may also occur in such cases and cause cysticercosis in ma[illegible] Infection with adults occurs when raw or inadequately cooked measly-meat is eate[illegible]

Personal hygiene can considerably reduce cases of auto-infection and gener[illegible] sanitary measures will stop both carry over of the eggs to man and dogs. Rigid me[illegible] infection in endemic areas may reduce consumption of measly pork. Raw pork, i[illegible] completely cooked meat, pickled, salted and conditioned sausages are unsafe in t[illegible] endemic areas and must be avoided. Thank God, taking of pork is prohibited [illegible] Islam. Like dog the pig is also reservoir of several human diseases.

3·6·2·5. *Multiceps multiceps* commonly occurs in dog and wolf. The larv[illegible] stages of the worm are found in herbivorous animals. Feeding on eggs, passed [illegible] definitive hosts in the faeces, cause common clinical condition "gid". The adu[illegible] develops in the definitive host, when it devours the brain of a sheep, died of gi[illegible] Cases of human *Cystecercus cerebralis* (*Coenurus* type) have been recorded from Par[illegible] South Africa, England and Northern Nevada. The human cases develop symptoms [illegible] aphasia and fits, hemiplegia and paraplegia.

3·6·2·6. *Multiceps serialis is* parasitic in the intestinal tract of dog and wo[illegible] As coenurus, it develops in the intra muscular connective tissue of rodents, baboo[illegible] and mandrils. Human cases were recorded from France. Each case had cutaneo[illegible] tumors containing coenurus with numerous scolices. A case is also on record fro[illegible] California.

3·6·2·7. *Echinococcus granulosus* is a common parasite of sheep raisi[illegible] countries. It has been reported from Australia, Tasmania, New Zealand, Northe[illegible] and Southern parts of Africa, Tanganyika, Southern parts of America, Southern a[illegible] Eastern Europe, Siberia, Turkistan, Mongolia, North China, Japan, Philippines, Syri[illegible] Lebanon, Palestine, Arabia and Indo-Pakistan sub-continent. The dog is the optimu[illegible] definitive host of the hydated worm. The wolf, jackal and domestic cat have al[illegible] been found infected in nature. The list of naturally infected animals is extensiv[illegible] The common reservoir hosts, however, are sheep, cattle and pig.

The definitive hosts get infected after consuming offal and viscera [illegible] an infected larval host, while the later host gets infection when it feeds on the egg[illegible] passed in the faeces by a definitive host.

Hydatid stage of the worm is larval form. In man the hydatid disease occu[illegible] after ingestion of the eggs. The infection is usually acquired in childhood and th[illegible] unilocular cysts are felt and diagnosed not earlier than 5 or 20 years after attainin[illegible] appreciable size or when it interferes with proper function of the adjoining vital organ[illegible] At times, the cyst may burst and precipitate anaphylactic reactions. Th[illegible]

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gravity of infection depends upon the type of tumour (unilocular or osseous) and site of infection. Commonest site of infection is liver. Cysts in brain, orbital capillary and heart valve produce fatal obstructions. Infection of bones (osseous cysts) causes erosion, crumbling and multiple fractures.

Do not allow children to fondle dogs. Ruthless destruction of ownerless dogs may solve much of the problem in a community. Organise proper disposal of offal from abattoirs and burtchers' shops. Prevent dogs from eating discarded viscera. Feed your dogs well-cooked meat. Observe strict personal hygiene. Always clean and scrub your hands before eating. Periodical deworming of dogs with arecoline hydrobromide will eliminate dangers in endemic areas.

3·6·2·8. *Echinococcus multiocularis* produce alveolar hydatid disease. Tundra mice is the intermediate host and dogs, foxes, etc., are the definitive hosts. The eggs may be found in the fields haunted by the intermediate hosts. The field workers, while picking berries or coming in direct contact with contaminated ground, pick up eggs. Alveolar hydated cyst is common in Southern Germany, Switzerland and U. S. S. R. It has also been recorded from Iseland, Northern Germany, Italy, France, Balkans, Uruguay, Argentina, Australia, Newzealand, England and Alaska. Its common site of development is liver and has been frequently found in lungs and other organs. It may be confused with mucoid carcinoma under development. It is a disease of old age groups but infection seem to occur in childhood.

Fields, frequented by foxes, wolfs and dogs are potentially dangerous. Warn children of the danger and disallow them playing on such grounds.

3.6.3. **Nematodan Parasites**—Many thousand different species of round worms parasitize invertebrate and vertebrate animals. Largest number of helminth parasites occurring in man also belong to this group. Some are primarily human parasites while others have a variety of mammalian hosts. The following round worms may occur both in man and dog.

3·6·3·1. *Trichinella spiralis* is a minute thread like, worm invader of the duodenal ınd jejunal mucosa of its host. Majority of the larvae, after emergence from the mother, 'each the intestinal lymphatics and a mesentric venules and are ultimately distributed hroughout the body. After a circuit journey, the larvae finally reach striated muscles ınd encyst. Muscles poor in glycogen are preferred. The diaphragm, muscles of larynx, ongue, abdomen, intercostal spaces, biceps and other constantly active muscles are ıost heavily infected.

Black and brown rats normally propagate infection in nature. Pigs, bears, cats, ogs, mangoose and other flesh eating mammals become secondarily infected. Man equires infection from consuming under cooked and improperly processed meat.

Trichinosis has a cosmopolitan distribution in man. It is less important in tropics ıd orient, but is common in Europe and United States. It is present in Kenya, Uganda, ınganyika and British Nigeria. It has not so far been reported from Indo-Pakistan b-continent.

Both adults and encysted larvae may develop within the same host. However, to mplete the life-cycle two hosts are required

Cooking of meat or storage in deep-freeze units is an effective preventive method. 'adiation of dressed meat with 'cobalt 60' kills encysted larvae. Public Health ucation may help reduction in incidence of human trichinosis. Destruction of rats and in testing of hogs does not help prevention of the parasite.

3·6·3·2. *Trichocephalus trichiurus* usually occurs in man and has also been re- ıded from other primates and pigs. In dog, whip-worm may produce an elevated

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Generally in man the bots cause cutaneous swelling at the point of its en
initiate a sort of *creeping myiasis* as produced by *Ancylostoma braziliense*.

3·7·2 *Dermatobia hominis* is a small warble fly. It is found in tropical A
from Central Mexico to Argentina. It deposits eggs on insects, usually feeding on the
dogs, cats, sheep, rabbit and other animals. The moment the vector is on the
blooded host, the eggs hatch and the emerging larvae invade its skin through the
—wound made by the vector. Flies may also originate on the damp laundry, w
produce infestation in small children. After becoming full fed within skin la
larva works its way out of the skin, drops and pupates in the soil.

3·7·3. *Cordylobia anthropophaga* is a calliphorine fly. It deposits eggs
ment pollated soil, usually in sleeping places of man and other animals, in faecal s
nated straw and sackings and also on clothing smelling of perspiration and uri
larvae, after hatching penetrate the unbroken skin and give rise to furuncular
Mature larvae leave the ulcer and pupate in the ground. Wild rats are said to
reservoirs. The domestic animals, dogs and cats are commonly parasitized.
in man is however, rare.

3·7·4. *The Dog Fleas* usually occur on restricted host groups but still ho
ficity cannot be said strongly marked. The badly kept dogs may harbour several
of fleas (*Ctenocephalides canis*, *C. felis* and *Pulex irritans*). In severe cases of in
these fleas may be incriminated as annoying host-hold pests of man. The places
by pet dogs and cats, are common breeding reservoirs of fleas. The lovers of th
and children feel much of the brunt. Irritating dermatitis caused by flea bites is
in children but rare in adults.

The dog fleas are also intermediate hosts of dog-tape worm (*Dipylidium c*
These insects may also transmit *Hymenolepis diminuta*.

Well scrubbed floors do not favour flea breeding. Well kept dogs and c
have very nominal flea population on the body. Vigilent dog lovers seldom er
pricks and itch while neglectfuls do always taste the fangs.

3·7·5. *Tunga penetrans* is found in tropical and subtropical regions of N
South America and also in West Indies and Africa. The adult female of the Ji
burries in the skin of its host. The dog and man are commonly invaded. Ba
labourers are common victims. Both males and female chigoes suck blood. Th
nated females, however, burrow in the skin, frequently between the toes and into
of the foot, and cause nodular swellings, which may ultimately ulcerate. Other pa
body may also be attacked. Extensive ulcers, abscesses or gangrene are usu
of great worry to man. Human infection may be acquired from direct contact w
or sand contaminated by infected patients.

Keep susceptible hosts clean. The dog-houses in general and the fl
particular should be kept properly swept so that the flea larvae do not find food

3·7·6. *Ticks* occur both on man and his dog. All ticks are haem
during one or more stages in their life-cycle. They give considerable dis
their host during feeding. As far as transmision of human diseases is
they are known to be second to mosquitoes alone.

Almost all species of ticks produce local and systemic disturbances by
in man. The bites may be very painful, initiate swelling and cause irrit
victim may complain of headache and malaise. Hot water bath may give
severe cases, however, some anti-histamine preparation may have to be used

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The ixodine ticks usually cause little damage. The dog ticks specially may remain attached to a person for several days without causing any annoyance. The argasid ticks, however, cause severe damage, pain and result in swelling and irritation.

3·7.6·1. *Dermacentor andersoni* is commonly found in United States. Its larval and nymphal stages feed on almost all available mammals. Adults, however, occur mainly on horses and man. It is most annoying to man. Its common victims are the outdoor workers. It is associated with Rocky Mountain Tick Fever, tularemia and human encephalitis. The mysterious injury caused by its bite is the paralysis of motor nerves. This serious condition may occur when the tick lodges at the back of the neck or the base of the skull near the vertebral column. Mechaincal injury caused by the bite of the tick is also most annoying. It bites man more freely and thus causes more damage. It also transmits Anaplasmosis, Babesia, Coxiella and Leptospira.

3·7.6·2. *Dermacentor variabilis* is common on dogs in United States. It is notorious for the transmission of Rocky Mountain Spotted Fever and St. Louis Encephalitis. It also transmits Anaplasma of cattle, tularemia to man and also causes tick- paralysis of dogs in North America. Its larvae feed on wild rodents. It freely attacks man, and causes harm to those who roam in meadows and woody places. Its salivary secretions may produce systemic toxemia which if not attended to may cause death of the host. Its mouth parts may produce appreciable pain and traumatic injury. Beside it, the wound may get infected with pathogenic organisms.

DDT emulsions give very satisfactory kill of dog ticks. Dibutyl adipate has been found good repellent. Use of protective clothing is effective. Close cutting of under-growth lowers tick-breeding. Running of a furrow turning plough and interculture may give tremendous relief.

3·7.6·3. *Rhipicephalus sanguineus* is a common dog tick in tropical and sub-tropical climates. Its principal host is dog but it may attack man. It is vector of malignant jaundice of dog. It may also transmit Rocky Mountain Spotted Fever. It has been found common in kennels and on animals affected with canine babesiasis. It may be involved in the transmission of Bovine anaplasmosis also. In Portugal, Rumania and Medeterranian basin it probably transmits Boutonneuse Fever. In North Africa, it transmits human relapsing fever.

3·7·7. *Follicular mite* (*Demodex folliculorum*) lives in the hair follicles and sebaceous glands of man and various animals and causes follicular mange. In dogs and cats, the skin becomes raw and excedatous. There is offending pruritis and chronic inflammation in more susceptible animals of poor health. A secondary bacterial action (staphylococcus) is frequent and responsible for postules and abscesses. Gammexane ointment when massaged into the lesions gives good relief.

3·7·8. *Linguatulid mite* (*Linguatula serrata*) is a cosmopolitan parasite and has been frequently recorded from man in Africa, Germany, Chile, Panama Canal Zone, Brazil and Switzerland. The mature larva occurs in the nasal and respiratory passages, tonsils and tonsillar crypts of dog, fox and wolf and rarely in man and other animals. The hosts expell eggs from the respiratory passages. These are swallowed by a suitable herbivorous animal *viz.*, horse, sheep, goat and rabbit. The larvae emerge from the alimentary canal and reach mesenteric lymph glands so as to develop into infective nymphal stages. The dogs are infected by eating infected rabbits or glands of the large animals. Infection in man occurs from eating raw lymph nodes of infected sheep and goat. The parasite when in lung, produces lot of congestion, resembling pulmonary disease. Intestinal obstruction may also occur in some cases and cause abdominal pain. The larvae may also invade other parts of the viscera. It was also found in a liver section of man in Columbia.

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PLASMA PROTEINS STUDIES IN NORMAL PAKISTANIS BY PAPER ELECTROPHORESIS

BY

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Nutritional deficiency of protein in humans leads to alterations in the economy of the body and these may be found whenever an individual has been forced by circumstances to subsist on a diet inadequate either in protein quality or quantity. It is, therefore, necessary to recognise the effects of protein deficiency which may result incidently in a number of clinical disorders. It is well understood why children deprived of protein cease to grow normally and kwashiorkor as a clinical syndrome of protein deficiency is now well recognised.

Generally accepted figures for normal concentration of proteins in blood serum are as follows:—

		Mean (*g*/100*ml*)	*Range* (*g*/100 *ml*)	*Per cent of Total* *Mean*	*Range*
Total Protein	..	7	6—8		10—
Albumen	..	4·4	3·8—5·0	60	52—
Globulin	..	3·0	2—4	40	32—
α	..	0·9	0·5—1·3	12	7—
β	..	0·9	0·6—1·2	12	8—
γ	..	1·2	0·8—1·6	16	10—
Fibrinogen (Plasma)	..	0·3	0·2—0·4	4%	

All the known circulating protective antibodies are concentrated in the globulin of the plasma, as also most of the protein fractions responsible for the carriage of lipids, sterols and iron. It is a remarkable fact that the human body maintains the level

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plasma globulins, even in the face of a severe lack of dietary protein. If parasitic infestations or infections are present, blood level of the gamma globulins which include the protective antibodies may actually be increased above normal, despite protein deficiencies elsewhere in the body. The fraction of the plasma proteins affected by protein depletion is the albumen, which is reduced in consequence. There is no known pathological condition in which plasma albumen is elevated. Indeed it is useful maxim of chemical pathology that "the plasma Albumen may be normal or reduced the plasma globulin may be normal or increased."

A fall in plasma albumen as a result of protein deficiency leads to diminished Osmotic pressure of the blood. The great physiologist, Starling[2] first pronounced the view that reduction of the Osmotic pressure of the blood resulted in the passage of fluids from the vascular system into the tissues, with consequent oedema. It is now generally agreed that lack of protein, though frequently an important factor in famine oedema, is not the sole cause; nevertheless in cases of oedema suspected to be chiefly nutritional in origin, it is useful to determine the concentration of plasma albumen; if it is reduced, the patient will benefit by an increase of protein in his diet.

The detection of a pathology, whether nutritional or other means, depends upon the detection of an abnormality, which inherently means using some 'normal' as a basis of comparison. It is in this field that workers have been delinquent and for the purpose of comparison reliance has to be made on normal values worked out elsewhere. The present study, therefore, is an endeavour to determine the normal values of plasma proteins of Pakistani subjects by paper electrophoresis.

Experimental—All the subjects for the study were selected from the district of Lahore of the former Panjab area in West Pakistan. They were divided into two groups-the rural and the urban. The urban group was mostly students and members of the teaching staff of the Government College, Lahore, belonging to the middle class of economic strata. The rural area samples were collected from Luliani, a village about 25 miles from Lahore, representing the commoners.

Capillary blood from finger tip, collected in heparinized capillary tubes to obtain plasma was used in the case of urban samples. In the case of rural subjects, blood samples were collected by venipuncture in heparinized centrifuge tubes and plasma was separated by centrifugation. Plasma samples, not older than three days, were used in the case of urban subjects, and in the case of rural subjects plasma samples stored in freezer were used.

For the determination of total plasma proteins, the gradient tube method of Lowery[3] or the Biuret method of Wolfson[4] was used. Beckman Model R paper electrophorsis system was used for determining plasma protein fractions. Procedure as laid down in Beckman Instruction Manual RIM-5 was followed for electrophoresis.

Results of the various observations are summarized in the following tables::—

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TABLE I

PLASMA PROTEIN FRACTIONS (gm/100 ml) OF NORMAL PAKISTANI URBAN AND RURAL SUBJECTS

	Groups		Total Protein	Albumin	Globulin					A/G Ratio
					Total	Alpha-1	Alpha-2	Beta	Gamma	
Urban	Adults (71)	Mean	7·34	4·81	2·23	0·155	0·36	0·62	1·90	2·23
		S.D.	0·45	0·37	0·37	0·52	0·09	0·14	0·31	0·49
	Males (43)	Mean	7·40	4·90	2·20	0·155	0·355	0·63	1·05	2·2[illegible]
		S.D.	0·5	0·32	0·32	0·58	0·09	0·14	0·30	0·[illegible]
	Females (28)	Mean	7·24	4·68	2·27	0·155	0·355	0·63	1·13	[illegible]
		S.D.	0·53	0·42	0·42	0·043	0·09	0·14	0·30	
Rural	Adults (80)	Mean	7·27	4·50	2·47	0·145	0·40	0·66	1·26	
		S.D.	1·77	0·58	0·66	0·061	0·01	0·16	0·42	
	Males (38)	Mean	7·24	4·34	2·60	0·156	0·40	0·67	1·36	
		S.D.	0·5	0·61	0·62	0·021	0·10	0·14	0·5	
	Females (42)	Mean	7·29	4·63	2·36	0·135	0·40	0·65	1·16	
		S.D.	0·58	0·5	0·49	0·07	0·13	0·17	0·39	
	Children (10)	Mean	6·90	4·30	2·31	0·155	0·40	0·61	1·14	
		S.D.	0·14	0·49	0·50	0·04	0·10	0·15	0·33	

PLASMA PROTEIN FRACTIONS OF NORMAL PAKISTANI SUBJECTS

	Group		Total Protein (g/100 ml.)	Albumin %	Globulin %					A/G Ratio
					Total	Alpha-1	Alpha-2	Beta	Gamma	
Urban	Adults (71)	Mean	7·34	65·59	30·41	2·12	4·91	8·57	14·81	2·23
		S.D.	0·45	5·10	5·10	0·72	1·24	1·90	4·30	0·49
		Range	5·95—8·25	47·36—71·48	22·53—48·64	0·00—3·48	2·87—8·86	5·23—14·44	8.26—28·79	0·97—2·91
	Male (43)	Mean	7·40	66·22	29·78	2·10	4·81	8·60	14·28	2·28
		S.D.	0·50	4·40	4·40	0·79	1·31	1·87	4·10	0·78
		Range	5·75—9·15	52·36—71·48	24·53—43·65	0·00—3·48	2.49—7.36	5·98—13.08	7·81—25·86	1·20—2·91
	Female (28)	Mean	7·24	64·62	31·38	2·15	5·07	8·53	15·62	2.15
		S.D.	0·53	5·80	5·80	0·60	1·20	2·00	4·40	0·48
		Range	5·95—8·05	47.36.71·30	24·69—48·64	0·85—3·44	2.67—8·86	5·23—14·44	9·15—28·79	0·97—2·89
Rural	Adults (80)	Mean	7·27	61·92	34·08	2·00	5·54	9·20	17·34	1·99
		S.D.	1·77	8·10	8·10	0·85	1·50	2·27	5·80	0·68
		Range	5·85—8·52	40·44—76·21	19·79—55·56	0·00—5·47	2·82—9·55	5·54—14·9	7·72—33·20	0·73—3·85
	Males (38)	Mean	7·24	60·08	35·92	2·16	5·55	9·36	18·84	1·84
		S.D.	0·50	8·50	8·50	0·30	1·36	1·90	6·80	0·68
		Range	6·14—8·52	43·27—72·66	23·33—52·73	0·00—5·47	2·85—9·55	6·15—15·05	8·52—33·07	0·82—3·11
	Females (42)	Mean	7·29	63·58	32·42	1·86	5·54	9·05	15·98	2·12
		S.D.	0·58	6·80	6·80	0·93	1·78	2·33	5·27	0·73
		Range	5·85—8·42	40·44—76·21	19·79—55·56	0·00—4·89	1·34—9·13	5.54—14·91	8·14—33·20	0·73—3·85
	Children (10)	Mean	6·90	62·43	33·56	2·26	5·88	8·87	16·55	1·90
		S.D.	0·14	7·30	7·30	0·45	1·54	2·15	4·73	0·69
		Range	6·30—7·50	46·52—71·87	24·13—49·47	1·64—3·16	3·68—9·23	5·32—12·64	11·41-25·99	0·94—2·98

Note—Mean value of Fibrinogen is taken 4% of the total plasma Protein.

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Discussion—The total number of normal urban ... 71 con
of 43 males and 28 females. Among the 90 normal rural subjects, 38 were adult
and 42 adult females, and there were 10 normal children in this group.

Mean total protein of urban subjects was found to be slightly higher than th
rural subjects. Among the urban subjects the total protein value of males was higher
that of the females. On the other hand, mean total protein of the rural females was slig
higher than that of rural males. In the case of children, their total protein
was found to be lower as compared with the adult values.

Mean plasma albumen value of urban males was higer than the urban fem
but these were found to be higher than those of the rural adults. Like the
subjects, the plasma albumen value of the rural females was higher than the rural
In the case of the rural children their albumen value was found to be lower than
rural and urban adult values.

An appreciable difference in the total globulin of urban and rural subjec
noticeable. On an average the values of urban subjects were lower than those o
rural subjects. The urban females had higher value of total globulin than the
males, but this was lower in the case of rural females as compared with their males.

The difference in the values of alpha and beta globulins of both the rural and
subjects is not well marked. But compared with the rural and urban adults, the
children showed higher value of alpha-2 globulin which is normally the cas
childhood.[5]

Gamma globulin values differed in the two groups those of the rural subjects
higher. These higher values of gamma globulin in the case of rural subjects suggest
these subjects possess greater immunity than the city dwellers because gamma glo
is the fraction which carries the immunity properties. Unhygenic rural environm
result in greater immunity among the rural population.

Comparison of males and females of the two groups indicates that rural male
females show higher gamma globulin values as compared with their urban counterp
In the case of rural children, their gamma globulin value is also higher tha
rural adults.

Albumen globulin ratio of the urban subjects is higher than that of the
subjects. It was the highest among the urban males due to their high albumen an
globulin values. The ratio was the lowest among the rural males.

Plasma protein values of the Pakistani subjects are comparable with the W
Standard [6, 7, 8, 9], but compared with Chinese subjects [10], plasma proteins va
the Pakistani subjects are higher.

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ACKNOWLEDGEMENT

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REFERENCES

1. Cantarow, A. & Trumper, M., Clinical Biochemistry, 1962; W. B. Saunders Company, Philadelphia and London.
2. Davidson, S., et. al., Human Nutrition and Dietetics, 1959; E. S. Livingstone Limited Edinburgh and London.
3. Lawary, O.H., & Hunter, T.H., The Determination of Serum concentration with a Gradient Tube; 4·159 (1945), 465.
4. Wolfson, Albumen and Globulin by a Modified Biuret Technique; Am. J. Clin. Path., 18 (1948), 723.
5. Josephson, B. & Gyllensward; Scand. J. Clin. Lab. Invest.; 9 (1957), 20.
6. Flyun, F. V. and de Mayo, P.; Lancet; 261 (1951), 235.
7. Hardwick, J., Biochem. J., 57 (1954), 166.
8. Lever, W. F., et. al., J. Clin., Invest.; 30 (1951), 99.
9. Portilo, R., Ortega, R.; Anales, Rial, Acad. Farus; 19 (1953), 327.
10. Joseph, S., Chen, M.L., & Ting, W.K.; Proc. Ninth Parific Science Congress, 15 (1957), 22.
11. Armstrong, S.H. Jr., Budka, M.J.E., and Morrison, K.C., J.Am. Chem. Soc., 69 (1947), 416.
12. White, Handler, Smith and Stetten; Principles of Biochemistry, 1964; McGraw-Hill Book Company, Inc., New York. 1964, 652.

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"FAMILY PLANNING ORGANIZATIONS AND CHILD WELFARE CLINICS IN PAKISTAN"

By

Dr. (Miss) H. M. Saeeda, M.B.B.S., M.P.H. (U.S.A.), Demonstrator, Institute of Hygiene and Preventive Medicine, Lahore.

Family Planning is a multipurpose broad-based, comprehensive, socio-preventive health project. It is a welfare measure designed to promote the well-being of the family, and the nation.

It is a plan that covers such a wide range of subjects as family spacing, sterilization, marriage guidance, etc. It is a means to make married life happy, plan the family and space conception to suit the financial position of the couple and help the wife and improve the race physically, medically and eugenically.

Pakistan's present annual birth rate of 50/1000 with mortality rate declining at 3% per annum, if fertility remains constant. Since the census of 1961, Pakistan's population has increased at the rate of 2·37% per year, as compared to the rest of the world where population increased at the rate of 1·7% per year. There is a great population pressure on our agricultural and animal resources.

It is estimated that there will be at least 20 million fertile couples in the country by 1970.

It is necessary to prevent at least 5·6 million births in the next 5 years so that annual birth rate is reduced from 50·40/1000. It is, therefore, proposed to cover by all the 20 million fertile couples in Pakistan with family planning programme.

This programme will be treated as an administrative activity of importance the district officers and union councils (in West Pakistan) and Thana Councils (in Pakistan) closely associated with it in clearly defined terms. Maximum amount of cial and administrative autonomy and decentralisation is proposed to be provided implementing agencies and sufficient staff and funds placed at their disposal.

Out of the 36 districts of West Pakistan and 16 districts of East Pakistan to this programme applies, its implementation will be based as follows:—

Year	West Pakistan Districts	East Pakistan Districts
1965-66	23	10
1966-67	25	11
1967-68	29	13
1968-69	32	15
1969-70	36	16

The provincial family planning boards will select districts for each year, priority to those where the programme is likely to be more acceptable to people.

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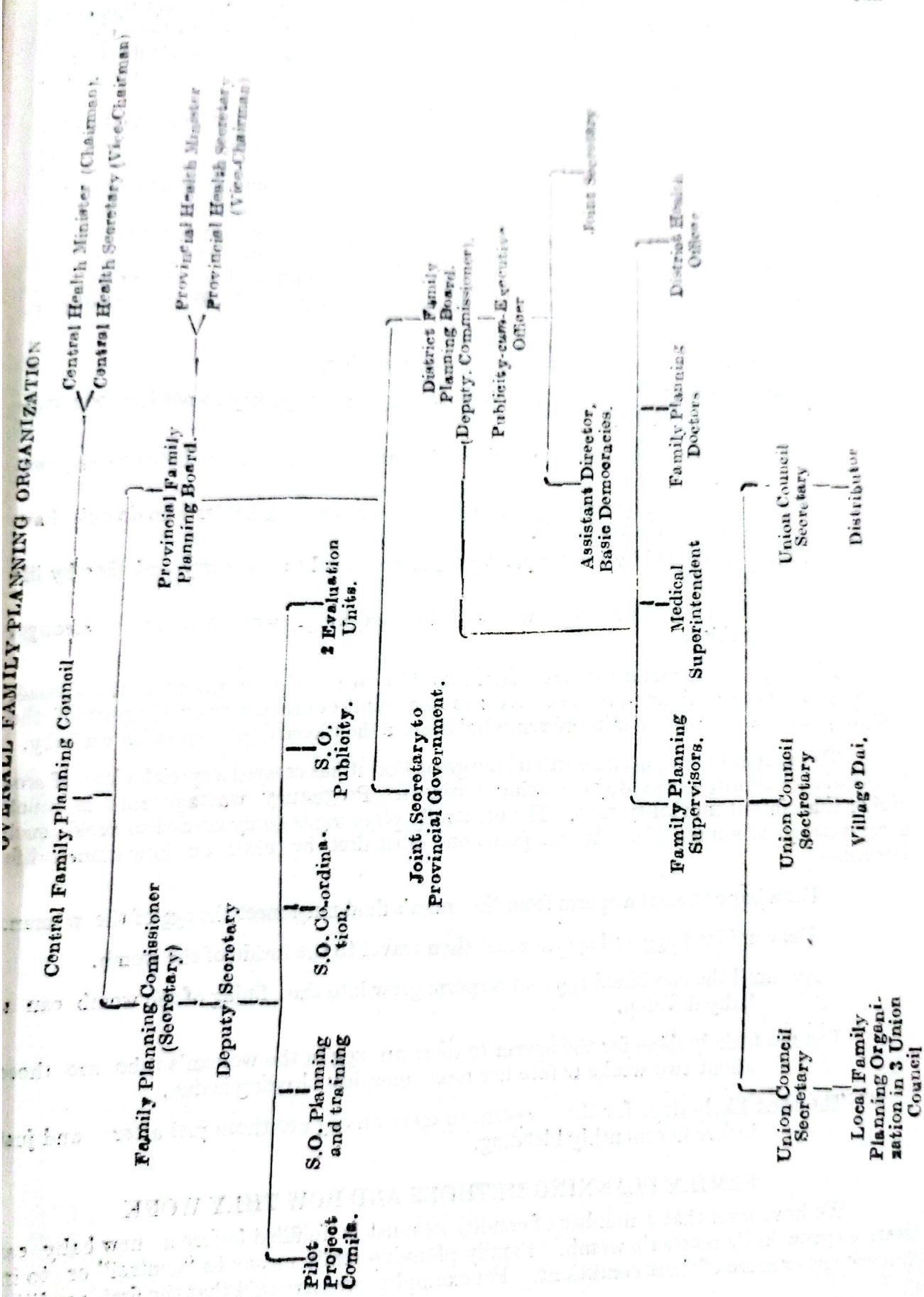

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Family planning can be best administered to the people through our existing public health services. In fact family planning should constitute an integral part of our maternal and child health programme. By using the existing MCH centres and female dispensaries for family planning programme we can easily reach a very large number of people at a time when they are most amenable to advice.

In accordance with the declared policy of the Government of Pakistan, family planning services are now being offered by various public health agencies through their hospitals, dispensaries and MCH centres. The need at the moment is to expand these health services so as to infiltrate in the remotest corner of the country. The staff who offer these services would be with a little extra specialization, in an ideal position to undertake family planning work. The belief system of the organization is an importance for success as the administrative organization, finance, personnel policies, etc. So unless the personnel themselves believe in family planning, they would be required for all medical and nursing personnel for teaching them standardized techniques of organizing and offering family planning services:—

Strong, healthy babies come from healthy mother.

Babies deprived of mother's milk because the next pregnancy comes too soon, may sicken and die.

Child-birth weakens a woman unless she can rest and recover between pregnancies.

Women weakened by too frequent pregnancies have weak babies who do not have a proper chance in life.

Women weakened by too frequent pregnancies tend to miscarry and thereby life is wasted.

Family planning prevents waste of life and helps women to have stronger babies.

Although the demand for small families and spacing of conception is widespread, but majority of the children are conceived not as a result of any desire on the part of the couples, not as a result of their indifference but despite their keen desire not to have a baby.

The demand for induced abortion is so great that it has created a special class of professional abortionists—who do a rearing business. Pregnancy wastage rate is much higher than infant mortality rate. Hence, family planning is badly needed to avoid such a big wastage of human life. At this point one must first be clear on how human life begins:—

For a baby to start a sperm from the man's fluid must meet the egg of the woman.

The combined egg and sperm must then travel to the inside of the womb.

Not until the combined egg and a sperm grow into the lining of the womb can a baby develop.

The most likely days for the sperm to meet an egg in the woman's tube are those about two weeks before her next monthly bleeding is due.

The least likely days for the sperm to meet an egg are those just after and just before her monthly bleeding.

FAMILY PLANNING METHODS AND HOW THEY WORK

We have seen that a number of conditions must be fulfilled before a new baby can start to grow in its mother's womb. Family planning really means to "control" or to influence one or more of these conditions. For example, we have said that the first condition

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is that a sperm from the man must combine with an egg from the woman. Preventing the meeting of the sperm and the egg is the birth control method we find in:—

SAFE PERIOD

WITHDRAWAL

THE CONDOM

FOAM

Another condition is that the lining, the bed of the womb, must be ready for the egg. A method that works along these lines is:—

THE PLASTIC LOOP (or IUD for intra-uterine device). A primary condition is, of course, that eggs are released from the ovaries. Just as in the nature the ovaries stop releasing any new eggs while the woman is pregnant. It is possible to stop new eggs from ripening by having the woman—

ORAL CONTRACEPTIVE PILLS

Another primary condition is that the sperm of the man can pass out from the testicles where they are made. The woman's egg must be able to pass from their growing place in the ovary through the tube. The passages through which the sperm or the egg must travel can be blocked by—

STERILIZATION

REFERENCES

1. Family Planning Scheme for Pakistan during the Third Five Year Plan period 1965—70, prepared by The Minister of Health, Labour and Social Welfare, Government of Pakistan, Rawalpindi.
2. Awan, Asghar Hussain, "Population Pressure and Family Planning", Mother and Child, September, 1963.
3. Klottrup Paul, "Family Planning—A Cornerstone in MCW", Mother and Child, November, 1963.
4. Haque, Anwar-ul. "Family Planning", Mother and Child, September—October, 1965.

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INDUSTRIAL HEALTH PROBLEMS OF RAPID INDUSTRIALIZATION WITH ASSOCIATED URBANIZATION

By

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Rapid industrialization with associated urbanization will continue to take place in the world as a measure for social and economic progress. As a result various kinds of influences will be exerted on the physical, mental and social health of the people.

Historical—If we never look back at the past, we shall not see the present and future hence it is worthwhile to review briefly the phases through which some developed countries have passed and the problems encountered during their history of industrialization. The industrial revolution in 18th and 19th centuries produced grave public health problems, many of which have taken a century to solve and some are still awaiting solution.

Between the *second half of the* 18*th* and the *first half of* 19*th century* the outstanding phenomons in the west were :—

(i) An explosive outburst of population, *i.e.*, between 1791 to 1831 there was a 60 per cent increase in the population of U. K.

(ii) *Rapid urbanization*—The scattered agricultural people became densily populated folk. From these two events stemmed out public health, social and industrial health problems.

The industrialization with increased urbanization depressed the level of public health. The inadequate housing conditions in towns led to overcrowding with increased chance of spreading communicable diseases, created an adverse family environments aggravated nutritional problems arising out of changed food habits, accentuated environmental health problems of water supply sewage and refuse disposal. In addition, the gainfully employed worker, often very in-experienced to begin, is exposed to the specific health hazard of his occupational environment.

Broadly speaking the public health problems created by rapid industrialization associated with urbanization can be classified under two headings :—

(*a*) General Public Health Problems facing every man, woman and child in the country.

(*b*) The more specific health hazards within industry created by working environment, namely, industrial diseases, accidents, fatigue, physiological and psychological stress.

Pakistan today is passing through the same experience. The rate of progress of industrialization has been remarkable in recent years. This has created same public health, social and industrial health problems which faced the highly industrialized and urbanized country like United Kingdom in the 18th and 19th century.

The process of industrialization and urbanization is creating a number of health problems of which the following deserve special attention :—

(1) *The creation of urban environment*—Attempts to industrialize almost lead to migration of people from rural areas to towns and cities. Indeed, in England and Wales today 2/3rd of the population live in towns of 20,000 or more population. According to 1961 census 5·2 per cent population of East Pakistan and 22·51 per cent population of West

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Pakistan was urban while the corresponding figures of East Pakistan were 4·4 per cent and 17·4 per cent in 1951, respectively. This shows that rapid urbanization is also going on in Pakistan. The more advanced countries become industrialized over a period of 100 yrs. during which time they were able to achieve adequate control of environmental sanitation and to develop suitable preventive health services. Pakistan today is confronted with rapid population increase, and is trying to reach a similar goal in a few decades and thus therein lie the main difficulties.

(2) *Increase in communicable diseases*—Crowding and poor housing facilitates more rapid spread of tuberculosis, cholera, typhus, plague, smallpox, diptheria and other communicable diseases.

(3) *Creation of adverse family environment*—With the migration of families to the industrial centres, the established pattern of mutual aid and help are disturbed. A changed living environment will aggravate intra-family conflect. Mothers working and away from home will create maternal and child health problems. There is also apt to be lessened family responsibility for the care of the aged.

(4) *Aggravated nutritional problems* :—The per capita food consumption in many developing countries remains below pre-war level, because population growth has out striped *per capita* food consumption. Though clinical signs of mal-nutrition are difficult to elicit wight/height indices are affected by many variables un-connected with nutrition.

However, a recent nutritional survey carried out by the Department of Nutrition and Occupational Health on nutritional status of industrial workers in Lahore revealed the following results.

Clinical examination of 1008 workers employed in six industries near Lahore were made to assess nutritional status of industrial workers. Of the 1,008 workers, 822 were given abbreviated clinical examination and 186 received detailed examination. Results of these observations showed that in general the nutritional status of industrial workers was found to need improvement. Only 31·3 per cent showed good appearance while 59·9 per cent were of fair and 8·8 per cent of poor appearance. The clinical findings suggest sub-optimum nutritional conditions in industrial workers.

(*b*) *Specific health problems of the gainfully employed workers in industry*—The health problems of the gainfully employed workers include not only those of adult population generally, but also the additional health problems arising out of the working environment, namely, occupational diseases and accidents, faulty working conditions, however may be responsible for physiological and psychological stress.

Industries surveyed—A representative group of manufacturing establishments in Lahore was surveyed in 1964 to get first hand information on hazards and facilities for coping with them. In general the information collected pertains to hazard in working environments and their control, compensation feeding facilities and general sanitation such as water supply, sewage disposal and toilet facilities.

95 establishments were surveyed employing at total of 12,221 workers. During the survey it was revealed that about 141 workers employed in different factories mainly in textile mills were below 15 years of age. They were working without age and fitness certificate from the Certifying Surgeons and were thus producing many child health problems. In contrast to this 81 workers even after attaining the age of 60 years were working on laborious jobs in foundries and re-rolling mills.

Exposure to potential occupational hazards—The chief health hazard to which the workers were exposed in foundry sections of engineering factories were that of silica dust released during fetling and drilling operations. In addition in most of engineering works workers were likely to suffer from adverse effects of high working temperature and risk of dermatitis on account of splashes of cutting oil during the process of cutting metals.

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In printing presses and wet battery manufacturing processes the hygiene of the working environments was deplorable and workers were exposed to risk of lead poisoning and managements were not at all aware of this hazard in these industries. In most of chromium nickel plating section of vehicle manufacturing concerns workers were running the risk of chromee ulcers and inhaltion of harmful vapours of nickel and chromium without safeguards. Conditions in most of industries surveyed were not conducive to good health or safety. General ventilation and illumination were inadequate. In some instances machinery was completely unguarded. Electric wires were bare. House keeping was in all cases poor. Floors were wet and in need of repairs. Specific exposures to toxic substances and materials were found to be typical of manufacturing establishments. For instances in plants manufacturing shoes or processing hides the workers were exposed to various dyes, solvents like benzene, acids and other chemicals used in hide and tanning operations. In textile plants the exposure to corton dust and dyes were common. Humidity was high in spinning carding and weaving rooms. Noise was a great problem to the risk of causing deafness among workers working in weaving sections.

Industrial diseases and accidents—No reliable data on the incidence of occupational diseases is available, but during the survey the sufficient evidence is available in the way of exposure of workers to dusts, vapours and gasses. Therefore one can conclude that industrial diseases do occur without recognition.

Specific inquiry about the incidence of chronic bronchitis with special reference to occupational diseases known as Byssinosis was carried out in textile industry—For over two hundred years textile workers have been known to suffer from a chronic respiratory disease caused by inhalation of dust the disease now called Byssinosis, from the Greek word meaning linen or fine flex has been described in cotton, flex workers. In its early stages it is recognised by a history of chronic bronchitis such as chest tightness and breathlessness on Mondays or on the first day at work after an absence. These symptoms are likely to get worse and may extend to other working days and finally giving rise to severe and permanent disability. In 1831 Dr. Kay a physician in Manchester called it as cotton spinners phthisis.

In 1861, Sir John, Simon Medical Officer to the Privy Council noticed high death rates from respiratory disease in certain English towns.

Oliver (1908) suggested that the manufacture of cotton was not an healthy occupation and that the dust in cotton mills was less in amount and less injurious than dust from flex, jute and hump. The basic principles of carding and blowing have not changed since the earliest days of spinning.

Short description of the process—Dust and short fibres are beaten and blown out of the cotton in the blow room.

In the card room the remaining fibres are then combed and straightened by cording, which further removes more dirt and defective material. The carding engine with revolving plates with power driven brushes produce clouds of dust.

In 1909 Collis examined 126 strippers and grainders he found that 74 per cent had the asthmatic complaint on Mondays and majority of them were severely affected. Morbidity rates of Lancashire cotton workers have been studied by Bradford Hill (1930) and found substantial excesses of respiratory sickness among Blow and Card room workers of the industry compared with cotton workers doing less dusty work. Keeping in view the investigations of these workers a clinical investigation was carried out by Department of Occupational Health and Epidemiology and Biostatistic in some of the textile mills of Lahore.

Object of the survey—was to assess the prevalence of Ch. Bronchitis with special reference to Byssinosis amongest the textile workers. To this object a special *pro forma* showing the important points of clinical history and examination of the chronic respiratory disease was designed. The clinical survey was carried

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out in the Chenab Textile Mills and Sardar Textile Mills situated on Multan Road, Lahore. These are situated outside the thickly populated area of Lahore Corporation.

Professor Schilling in 1953 proved by the clinical survey that the disease can be diagnosed by history and clinical examination alone. He also indicated that the prevalence of the disease is more in Blow and Card room workers of the industry. Keeping in view these facts we took all the workers of Blow and Card Section of these two Textile Mills. In other sections i. e. weaving, ring reel and flufly every fifth workers was subjected to clinical history and examination. The history and clinical examination was carried out and recorded by Dr. M. A. Mallick of Department of Occupational Health, Institute of Hygiene and Preventive Medicine, Lahore.

In this survey 115 workers were subjected to history and clinical Examination. Table I shows the distribution of worker and age structure of the workers :—

TABLE I

Age Group	Blow Room	Card Room	Fluffy section	Reeling	Rings	Weaving	Total
Below 15 years ..	..	..	..	..	..	..	..
15—20 ..	..	1	..	1	10	..	12
20—45 ..	14	8	12	15	41	3	93
45—60 ..	..	1	..	..	..	8	9
60 and over ..	1	..	..	..	..	..	1
Total ..	15	10	12	16	51	11	115

TABLE II

SHOWS THE EXPOSURE OF WORKERS IN DIFFERENT SECTIONS OF THE INDUSTRY

Exposure Period	Blow Room	Card Room	Fluffy Section	Reeling	Rings	Weaving	Total
0—2 ..	3	5	4	5	22	1	40
2—5 ..	4	2	3	10	9	10	38
5—10 ..	2	..	2	1	12	..	17
10—15 ..	6	2	3	..	6	..	17
15 and over ..	..	1	..	..	2	..	3
Total ..	15	10	12	16	51	11	115
Mean Exposure ..	7·1 yrs.	5·5 yrs.	5·6	3 yrs.	5 yrs.	3·6	

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TABLE III

SHOWING NUMBER OF WORKERS WITH HISTORY AND CLINICAL FINDINGS OF THE WORK.

Section	Mean exposure	Number of normal cases	Cough with or without expectoration	Breathlessness with or without exertion	Tightness of chest	Empty semes	Bronchial Breathing with or without adventious sounds
	Yrs.						
Blow Room ..	7·1	2	11		2	1	9
Card Room ..	7·1	10	5	..	..	..	4
Fluffy Sect.	5·6	8	4	..	..	..	3
Reeling ..	3	14	2	..	..	..	..
Ring ..	5	49	2	..	..	..	1
Weaving ..	1—2	9	2	..	..	..	2

Results—Clinical Survey of 115 workers employed in blowing, Carding, Fluffy, Ring, Reeling and Weaving Sections of the Textile Industry, showed the following results:-

Blowing Section—In this section 87 percent of the workers gave the history of chronic Bronchits; while 60 per cent of the total Workers in Blowing Section gave posstive history and also showed clinical signs of chronic bronchits, namely cough with or without expectoration, breathlessness on exertion; bronchial breathing with or without adventitions sounds and emphysema. It means 70 per cent of the workers with positive history also revealed positive clinical signs of chronic bronchils. But none of them complained of chest tightness on Monday or other days of the week which according to Dr. Schilling and other investigators is the diagnostic signs of Byssionsis. In my opinion the reason is less exposure period while according to Dr. Schilling mood, in order to contract the disease the minium exposure should vary between 20—25 years while in this inquiry the mean exposure was 7·1 years.

2. *Carding Section*—In this section 50 per cent of the total workers gave the positive history of chronic bronchils and out of which 40 per cent revealed positive clinical signs of the disease. The mean exposure was 5·5 yrs. No case of Byssinois was detected because of lesser number of years of exptosuse to the cotton dust.

This shows that the prevelance of the disease in this section is 37 per cent lesss than the prevalence of disease in Blowing Section which comparatively is more dusty.

3. *Fluffy Section*—In this section 50 per cent workers gave positive history; one of which 70 per cent revealed positive clinical signs of chronic Bronchits. The mean exposure was 6·3 years.

4. *Ring Section*—About 4 per cent workers in this section gave the positive history of chronic Bronchils. Out of which on examination only 2 per ent of the workers revealed the positive clinical signs of the disease.

5. *Reeling Section*—12·5 per cent of the total workers of this section gave positive clinical history of the disease, but on examination no positive findings of the disease were detected. The mean exposure was 3·5 years.

6. *Weaving Section*—In this section 19 per cent of the total workers gave positive history as well as clinical signs of the disease. The mean exposure was 3·6 years.

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BOOK REVIEWS

1. *Atlas of Urinary Deposits.* By Ronald Freake, A.A.I.M.L.T., F.R.M.S. and Jack Nayman, F.R.C.S.E., F.R.C.S., F.R.A.C.S. (Pp vii + 60, $1.00) 1965. Melbourne: Royal Melbourne Hospital.

This Atlas contains 49 excellent microphotographs in black and white depicting spun specimens of urine. These show appearances of casts crystals, cellular elements, bacteria, mycelia, yeasts, spermatozoa, amorphous deposits, foreign substances and artefacts. Short notes on techniques and interpretations of routine tests of urine analysis are also given. It is a commendable presentation and would be of value to the medical student, pathologists and the laboratory technicians.

ZAFFAR-UL-AZIZ

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Assistant Professor of Pathology King Edward Medical College, Lahore.

2. *A Synopsis of Medical Jurisprudence and Toxicology,* by Dr. S. Siddiq Husain, M.B., B.S., D.P.H., B.Sc., B.A., H.P., W. P. H. S. (I), (p p.254, text-figures 40, Price Rs. 15·00), Din Muhammadi Press, Lahore, (1965).

The author, Dr. S. Siddiq Husain was Surgeon Medico-legal, West Pakistan, for about eight years. In addition, he has 36 years practical experience in Medico-Legal work to his credit. He has also been teacher in Forensic Medicine at the King Edward Medical College, Lahore, since 1958. The monograph is decidedly the fruit of rich experience. As far as we know, it is the first book in the subject to be published in Pakistan.

The book is well written, in lucid style, to be understood by an average student in medical colleges of Pakistani Universities. It is seeded with first hand knowledge in Medico-legal work and is therefore, equally suitable for medical officers, teachers in Forensic Medicine, Legal profession and police officers, who frequently handle medicolegal cases.

Formerly, we have been importing books on Forensic Medicine from foreign countries. It involved much foreign exchange. Moreover, most of those books do not give true picture of "Medico-legal Crimes" in this country. These two factors are added assets and must be enough to extend welcome reception to this much needed book.

It is a convential text-book on Forensic Medicine. The author seems to have consulted extensive literature on the subject. A list of bibliography must have helped an inquisitive reader.

In our opinion a well balanced book, free of much pedding. A note on "Prevention of Medico-legal Crime" is most interesting reading and a new approach to stop crimes.

This will surely prove to be a popular new text book, the minor defects, which one may find here and there, will doubtlessly be eliminated in a second edition.

M. A. R. ANSARI
(Managing, Editor)

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