Frontal writing lever is an isotonic lever. It allows the tissue to contract freely against a constant tension. Therefore, the recording is called isotonic recording. The writing point of the frontal writing lever rotates freely about its axle. Hence, recordings are done on the smoked paper of the drum without much friction.

(b) Class II type lever

In class II lever the fulcrum lies at one end beyond the point of attachment of the tissue e.g. Starling's heart lever.

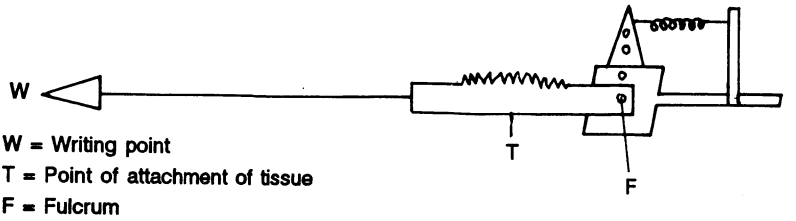

Fig. 2.

Adjustment for magnification

In order to magnify the actual contraction response of the tissue, the lever should be adjusted properly. The distance between the Fulcrum (F) and the writing point should be greater than the distance between the fulcrum and the point of attachment of the tissue.

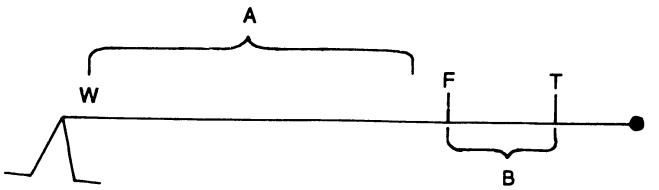

Fig. 3.

$$\text{Magnification value} = \frac{\text{Distance between fulcrum and writing point (A)}}{\text{Distance between fulcrum and the point of attachment to the tissue (B)}}$$

The tissues showing less contractility (e.g. Frog rectus abdominis muscle) needs five times to ten times magnification. Rat uterus muscle requires 2-4 times magnification. Guinea pig ileum needs 5-7 times magnification.

Adjustment of load or tension on frontal writing lever

Balance the frontal writing lever by placing sufficient plasticine on the

shorter arm near the end of the lever. This is done because the fulcrum is usually away from the mid point. Then, place the prescribed weight on the balanced lever exactly at the site of attachment to the tissue. Fix small quantity of plasticine (equal to the prescribed weight) on the longer arm of the lever so that distance between the fulcrum and the point of attachment of tension (load) is equal to the distance between the fulcrum and the point of attachment to the tissue. After mounting the tissue in the organ bath remove the prescribed weight from the point of attachment to the tissue and attach the thread of the tissue.

The load prescribed for various tissues are as follows :

Frog rectus abdominis muscle	1 gram
Guinea pig ileum	500 milligram
Rat intestine	500 milligram
Rat uterus	500 milligram
Rabbit intestine	500 milligram to 1 gram
Rat fundus	1 gram

Smoking of drums

The Kymograph graph paper has a glossy surface and a non-glossy surface. The paper should be wrapped round the drum (glossy surface out) and fixed with gum. Using a kerosene burner smoke the glossy surface of the kymograh paper. Rotate the drum while smoking in order to get a uniform smoke.

Fixing of the tracings on the kymograph paper

Fix the tracings on the kymograph paper by dipping the paper in fixing solutions. Varnish diluted 10 times with alcohol can be used as a fixing solution or a saturated solution of colophony in ethylalcohol or methylalcohol can be used as a fixing solution.

Physiological salt solutions for isolated tissues

All physiological salt solutions are prepared in distilled water using Analar Grade Chemicals. Physiological solutions are prepared fresh and used within 24 hours. Storage is not recommended because of the problems of microbial growth. While preparing the physiological salt solution, calcium chloride should be added last in the form of solution in order to prevent the precipitation of bicarbonate. Because isolated

Cleanliness of animal house

There should be separate facility for cleaning the animal cages and the animal room should be kept clean always. Animal feed should be stored properly.

Disposal of sacrificed animals

An incinerator can be used to dispose the sacrificed animals and other waste from the animal house.

Code for identifying the animals

It is necessary to identify individual animal of a group or those housed in one cage. To identify individual animals the markings are done with picric acid solution (10% aqueous solution of picric acid).

Administration of drugs to laboratory animals

Syringes and needles

Syringes and needles must be sterile for use in rabbits, guinea pigs and dogs. They need not be sterile but should be extremely clean for use in rats and mice.

Maximum volume of drug solution to be given to animals

Volume in ml

	Intravenous	*Intramuscular*	*Intraperitoneal*	*Subcutaneous*	*Oral*
Mouse	0.5	0.05	1	0.5-1	1
Rat	1	0.1	2-5	2-5	5
Guinea pig	1	0.25	2-5	5	10
Rabbit	5-10	0.5	10-20	5-10	20
Dog	10-20	5	20-50	10	100

Techniques of drug administration in animals

Oral administration

Special feeding needle with ball-shaped end is required to administer solutions or suspension to rats and mice. Special mouth blocks are required to feed guinea pigs or rabbits.

Intravenous

Rabbit : Marginal ear vein is preferred.

of Type-I hypersensitivity reactions, ascorbic acid metabolism and also for the bioassay of digitalis preparations.

The following isolated tissues of guinea pig are used in experimental pharmacology.

Guinea pig ileum : For the bioassay of histamine, identification of H_1-receptor agonists and antagonists, muscarinic receptor agonists and antagonists and 5-hydroxytryptamine activity.

Guinea pig tracheal chain : For the evaluation of beta-receptor agonists.

Hamster

Two species are usually used in experimental pharmacology :

1. Syrian or Golden hamster. Adult body weight 80-90 g.
2. Chinese hamster. Adult body weight 35-40 g.

They are used for the evaluation of antidiabetic agents, cytotoxic agents and immunomodulating drugs. They are also used in nutrition studies. Isolated stomach strips are used for the bioassay of prostaglandin E and F.

Dog (canisfamiliaris)

Dogs are used for the evaluation of antidiabetic agents, antiulcer drugs and drugs acting on the cardiovascular system.

Monkey (Macaca mulatta)

Monkeys are used for the evaluation of psychopharmacological agents, immunomodulating agents and drugs affecting reproductive function.

Frog (Ranatigrina)

Frogs are used for the evaluation of local anaesthetics. The following isolated tissues of frog are used in experimental pharmacology.

Isolated frog heart : For the identification of beta-receptor agonists and antagonists, muscarinic receptor agonists and antagonists, cardiac glycosides, potassium ions, calcium ions and calcium channel blockers.

Rectus abdominis muscle : For the identification of nicotinic receptor agonists and antagonists and also anticholine esterase agents.