X of the plant.

2).- Some observations in relation with ***Lepidium meyenii***.
3).- Histological studies.
4).- Qualitative-chemical analysis and percentage of humidity and ashes.
5).- Action of the active principles on the genital organs of animals under investigation.

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INTRODUCTION

The presence of the Andes Cordillera and the Humboldt Peruvian Current, determine in the Peruvian territory areas notably different from the ecological point of view. This nature panorama constitutes an ideal place for carrying out biological studies, where a variable Peruvian flora is found in the diverse natural regions of the country, what invites to its scientific investigation and of course to a better knowledge of the same.

The wise Weberbauer (1945) was one of the main propellers of the systematical and ecological study of this rich national flora. We also must mention that in a parallel way to the botanical studies progress, the physicochemical sciences broad the knowledge related to the structure, constitution, properties and practical applications of the plants.

By the above mentioned concepts and what is mentioned by Palacios (1959) in reference to the fertilizing properties of the plant commonly nominated as "maca", which grows in the Puna region of Perú (gramineous plateau) and in the same way, according to the communications of Pulgar Vidal (1960), who makes references to the maca as a powerful fecundant plant that incorporated to food promotes the life at high altitudes and besides he continues, "the only botanist that reports about it is Don Hipólito Ruiz who saw it, but not studied it, since he did nor indicate its Latin name, neither describe it. He did not either make to draw it, limiting to transcribe what the natives from the Pampa of Junín said about it." The mentioned author did not either go as far as the scientific determination of the species, making simply the compilation of data about the plant properties. Other authors Herrera (1929), Weverbauer (1945), did not mention this species either.

Considering the importance that would bring by itself the verification of the previously referred properties, it is found convenient to carry out a detailed and scientific study of the plant. It is convenient to utilize as a foreground its taxonomic, phytochemical and preliminary study about the action that could have on the genital male and female apparatus as well as on the procreation of the animals being investigated, what is the present work subject, leaving for further study the pharmacodinamics of the active principles in more advanced animals.

CHAPTER I

MATERIALES AND METHODS

Studied area

The ecological observations, as well as the botanic material compilation, have been made in the Puna areas of the departments of Junín and Puno, between altitudes of 4,000 and 4,600 m. The localities that merit greater observations are Achipampa, Puquio, Yanacancha in the Huancayo province, and Carhuamayo, Natacancha, Ninacaca, Vico, Chaquita and Huaire in the Junín one.

The dates of field investigations in the department of Junín are January and May 1960; April and June 1961 and in the department of Puno December 1961. See illustrations (Map of Perú and journeys).

Laboratory works

The laboratory studies have been carried out in different scientific institutions. For the taxonomic determinations the work was carried out in the Botany Laboratory of the Universidad Nacional Mayor de San Marcos, with consultations to the Museo de Historia Natural Javier Prado. As key codes were used those of Engler (1919) and those of Mc Bride (1938). Besides, through Dr. Octavio Velarde, Main Professor of General Botany of our University, I resorted to the specialist on Cruciferae Dr. O. Bolcke, of the Faculty of Agronomy and Veterinary of Buenos Aires, Argentine, who had consulted as well to the Zurich and Munich Herbaria in Swiss and Germany, respectively.

The histochemical works have been carried out in the Criminology Laboratory of the Police of Investigations, and the qualitative analysis in the Faculty of Pharmacy and Biochemestry of San Marcos following the recommendations in the works of Floriani (1938), Calvet (1944), Villacechia (1949), Guardia Mayorga (1929), and "The Merck Index"

(1960). The experiments have been conducted in the Pharmacology Lecture-room of the Faculty of Medicine.

Techniques and reagents utilized

For the histochemical studies of the root the following procedure was used: utilizing a hand-knife root cuts were prepare which sections had more or less 10 µ. The cuts were placed on slides with distilled water, where afterwards the corresponding reagent will be added. For the microscopic observation it is convenient to protect the preparation with a cover slip.

A.- Reagents for the identification of starch.- The reagent is placed at one of the preparation sides and the running of the liquid is provoked, placing a fragment of blotting paper at the opposed side.

Reagent - Iodized Iodine solution: Iodine.....2 g
Potash iodine..4 g
H_2O.....100 ml

B.- Identification of cellulose and lignin.- The root cut after been washed with distilled water is treated with eosin solution during a minute. It is washed again and mounted in glycerine.

Reagent - Eosin solution: Eosin.....1 g
H2O.....100 ml

C.- Identification of alkaloids.- Over the fresh cut add a drop of the reagents to certify the presence of alkaloids, using the general reagents of Mayer, Bouchardat and Dragendorff.

Reagent - Mayer's: Mercury bichloride...13 g
Potash iodine.....6 g
H2O.....100 ml

D.- Determination of humidity and ashes.- The root, weighted in an scale with an appropriate tare, was cut in thin disks, and 20 g were taken and placed in a stove at 100°C during 24 hours. After drying, the sample is weighted again to see what is the difference in weight. The difference will indicate the percentage of humidity. For a better verification of the results the test is repeated three times, in a continuous way, until a constant weight is obtained.

To determine the ashes, the root residues are taken to a muffle at 900°C, during half an hour, until to obtain white ashes which are then weighted.

E.- Procedure for the extraction of the active principles.- For this analytic procedure 50 g of pulverized product were taken (the necessary amount according the soxhlet capacity); the root is stripped and dried in the stove at 70-75°C, during 12 hours. From this pulverized product 50 g are weighted and subjected to the successive action of a dissolvent, acetone, sulfuric ether, alcohol and distilled water being the more utilized.

All these products are used chemically pure, the volume of dissolvent used in each extraction is more or less 25 ml and the soxhlet procedure takes 12 hours.

Each extract was placed in a dessicator with chemically pure H_2SO_4; after the extraction, a label was placed with the extract characteristics to avoid any alteration by external contact. Once the extraction with the different dissolvents was finished the

recognition of the extracts started in a crescent way, since alterations could be produced very easily.

We must describe the extraction procedures with the mean dissolvents.

a).- Acetone extract.- Sixty-five extractions were carried out in 16 hours and 10 minutes, at 56°C, acetone boiling temperature. The residue was dried under H_2SO_4.

From the extract, 5 ml were taken and 28 ml of acidulated water and sulfuric ether were added, carrying out three washings. Two layers were obtained:

1.- Superficial ethereal layer
2.- Acidulate water layer

The second layer is alkalinize with CO_3Na_2 till reaching a pH of 8.5 and then we make 3 washings with sulfuric ether, obtaining two layers again:

2.1.-Superficial ethereal layer
2.2.-Alkalized water layer

2.1.- In the superficial ethereal layer, it was performed the concentration and purification. Then evaporation took place until complete dryness. The residue was treated with drops of acetic acid obtaining the active principle under the form of acetic solution.

To verify the presence of the active principles, the general reagents of Mayer, Dragendorf and Bouchardat were used.

Chromatograms were made to determine the Rf. And the amount of existing alkaloids according to Rodríguez references (1960), for what it was used a mobile phase:

Acetic acid.....10 ml
Butanol. N. .....40 ml
WaterKEYBOARD()NESTFORM(ENDRECORD 44X4P#uciferae
Genus : ***Lepidium***
Species : ***Lepidium meyenii*** Walp

A.- External morphology description.- It has been selected a specimen corresponding to the Achipampa locality. Emphasis has been placed on the root study, so schemes have been included corresponding to specimens from other localities (See plates 1, 2, 3, 4 and 5).

The plant is herbaceous, annual, and rosetted. The root is napiform, hard, with a great content of starch; 4 to 7 cm long by 3 to 5 cm in diameter in the widest portion. The main stem is reduced about 5 cm long, approximately. The plant branches from the base; 10 to 16 cm long. The basal leaves are rosetted and 7 to 15 cm long by 1½ to 2 cm wide; pinnatifid, bipinnatifid; the caulinary leaves are relatively small, alternated, scattered, 2 to 5 cm in length; those at the base present the blade doubly divided, those at the middle are pinnate-divided, and those at the top slightly divided.

In the inflorescence the flowers are arranged in short clusters and rarely in compound clusters, besides there are groups of axillary flowers. The flowers are hermaphrodite, actinomorphous, and small. The calyx is of overlapped preflowering with

four free sepals, ovate-elliptical shaped, concave, 1.2 to 1.4 mm in length and 0.7 to 0.8 mm wide, light-green colored and whitish borders. The corolla has four free petals, alternate sepals, and it is linear, slightly bent at the top, 1.4 to 1.6 mm long, white color. The Androecium has six tetradynamous stamens, two of them fertile with enlarged and swelled filaments; the anthers are dithesic, fixed at their bases, with longitudinal dehiscence; the pollen grains are more or less ovate and yellow in color. The four remaining stamens are sterile and very small, arranged at the side of the fertile ones. The gyneceum is syncarpous, with upper bicarpelate and biloculate ovar of 1.5 mm long with two anatropous and apical-central placenta ovules, style very reduced and stigma slightly globe-shaped and papillose.

The fruit is a silicle slightly emarginate 2.8 to 3.3 mm long by 2 mm wide, with only one seed in each cell; longitudinal dehiscence running along the partition-wall which is membranous.

Floral formula: K 2-2; Co 4; A 2-4; C (2). (See plates 6, 7 and 8)

B.- Histological description.- In a transversal cut of the root (see microphotographs 1, 2, and 3), it is possible to observe from the periphery to the central cylinder the following zones:

1).- Suber (cork).- Constitute by three rows of cells. It is also possible to observe numerous lenticels.

2).- Main cortex and cortical parenchyma, with approximately 12 rows of cells more or less isodiametrical, with meatuses.

3).- Wood, observed in a stepped formation of wood and parenchyma radially layed out.

4).- Central medule, constitute by isodiametric cell and disperse wood.

In a transversal cut of a secondary stem we may observe from the periphery to the center the following layers:

1).- Epidermis, composed of two rows of flattened, large cells with a quadrangular contour. The internal layer is composed of a row of smaller cells.

2).- Cortical parenchyma, composed of large, more or less isodiametric cells with big and numerous meatuses. Limiting the cortical parenchyma we observe, towards the internal area, two rows of small cells.

3).- Liber-woody bundle, found in groups separate by large zones of sclerenchymatous fibers and sieve tubes.

4.).- Medullar parenchyma, ample and with large isodiametric cells leaving meatuses among them (microphotographs 4 and 5).

In a transversal cut of the leaf, there is not a notable difference between both sides of the blade (upper and lower epidermis), but it is observed that the palisade parenchyma cells forming the upper epidermis are slightly larger than those corresponding to the lower epidermis. Isofacial type.

In both sides, the cells leave meatuses and present abundant chloroplasts. The

epidermis has a gross cuticle; the epidermis cells are arranged in rows in both sides with abundant stomata. The vascular bundles are surrounded by sclerenchymatous fiber (microphotographs 6 and 7).

Some observations in relation with *Lepidium meyenii* Walp

The areas that offer favorable ecological conditions for the development of the plant ***Lepidium meyenii***, seems to be those sites situated above 4,000 m over the sea level.

Some alive specimens have been brought to Lima City, which have continue their growth till seed was obtained. Maybe these observations collaborate to carry out further investigations in reference to its acclimatization in the coast (photographs 2 and 3).

For the culture the natives carry out the following process:

a).- The right site is cleaned (photograph 4).

b).- The seed is spread over the land trying that it lays on the soil surface (photograph 5).

an Juan of Jarpa locality some people cultivate it for feeding themselves, they have to expose it to the sun during 15 days and use it in 'mazamorra' (some kind of thick soup), sweets and boiled; as a drink they use it macerate in alcohol.

The tuber yield per *yugada* (3,333 m^2) is 11 or 12 sacks which are sold in the local traditional fairs. Some farmers say that this plant impoverishes the land where it is cultivated, inclusive according to the popular tradition they know some places where these products were grown and where no even one plant grew there since 300 years ago.

Histological studies

A.- Starch identification.- Once the reagent is applied to the preparation, the characteristic blue coloration of the starch granules is observed under the microscope, in all the cortical parenchyma, so a positive reaction took place.

B.- Identification of cellulose and lignin.- Under the microscope it is possible to observe the ligneous cells around the vascular bundles, the red color corresponds to lignin and the brown color to the presence of cellulose.

C.- Identification of alkaloids.- Once treated the preparation with the Meyer reagent it is observed under the microscope. A green-yellowish precipitate appears around the vascular bundles, epidermis and sub-epidermis. The parenchymatous cortical tissue and the medullary radiuses appear white-yellowish. It is a positive reaction.

The Bouchardat reagent gave a green-yellowish precipitate in the central medulle. The medullary radiuses were yellow-whitish tinted and the starches in the parenchymatous cortical tissue and the medullary radiuses were blue stained. The suber, notoriously became brown-redish, The reaction was positive.

With the Dragendorf reagent it was observed that around the vascular bundles a greenish precipitate was formed and the medullary radiuses and parenchymatous tissues stained in yellow color. This is a positive reaction.

Qualitative chemical analysis and percentage of humidity and ashes

Percentage of humidity and ashes

Humidity.- Tare-capsule .....48.8084 g

Day 05-15-61: 48.8084
(37.5200)
=======
11.2884

11.2884 x 5 ...= 56.4420%

Second weighing:

Day 05-19-61: 48.8084
(37.5060)
=======
11.3024

11.3024 x 5 = 56.5120%

Third weighing:

Day 05-20-61: 48.8084
(37.4750)
=======
11.3334

11.3334 x 5 = 56.6670%

Constant weight: 56.5403%

Ash determination: 20 g of powder

Capsule plus ashes 12.9015

Capsule alone 12.3770
======
0.5245

$$\text{Ashes (\%)} = \frac{0.5245 \times 100}{20} = 2.622\%$$

A.- Acetonic extracts.- Soft consistence, brown-yellowish in color and with a particular aromatic odor.

The alkaloid identification was carried out by means of general reagents:

Mayer .....+ + +

Dragendorf .....+ + +

Bouchardat .....+ + +

The amount of alkaloids was determined by chromatographic paper:

a).- Circular.- Radial (photograph 7)
Central (photograph 8)

Rings: Rf 0.680
Rf 0.346
Rf 0.198

b).- Ascending.- Rf 0.851

With the metallic-iodine developer it was possible to obtain even three rings of alkaloids, in central-circular paper; in the radial there was not much difference. In the ascending column a large alkaloid was obtained.

B.- Ethereal extracts.- Soft in consistence, light brown in color, with a particular and pronounced aromatic odor.

The identification of the alkaloids by means of general reagents:

Mayer ..... + + +

Dragendorf ..... + + +

Bouchardat ..... + + +

The identification of sterols was negative (Liebermann's reagent).

The fatty acid determination was positive. There were not saponins which was supposed to exist since the foam should has to remain in an acid medium. Instead, it is indication of the presence of fatty acids that form salts in alkaline medium and spoils in acid medium, in the fatty acid. The fatty-acid mixture fusion point is 50°C. The melted grease presents an slight greenish fluorescence.

The reaction for tannins was positive.

The reaction for glucides was positive.

C.- Alcoholic extracts.- Oily consistence, oleaginous, brown and with a pronounced aromatic odor.

Determination of alkaloids was made by means of general reagents.

Part II.- The reaction for tannins was negative.

D.- Aqueous extracts.- Soft extracts, light brown in color and with a characteristic odor.

The identification of glucides in the solution obtained was made using the corresponding reagents. With the Fehling's solution a precipitate is obtained (yellow-milky at first, and brown and red afterwards). With the Tollens one, a precipitate of reduced

silver is formed. The Fehling's solution after hydrolysis takes place gives a wine-red coloration. With the tetrazolium salt becomes violet.

When examining the residue, the result for the identification of anthocyanins or pigments was negative. The glucides were again identified with the reagents employed in the solution.

Action of the active principles on the genital organs of the animals under investigation

Lot A.-

Sex	No. of examples	Average weight before the experiment	Experiment duration	Average weight after the experiment	No. of litters
X	2	79.55 g	6 months'	162.8 g	----------
C	8	80.00 g	6 months	134.5 g	47

Lot B.-

Sex	No. of examples	Average weight before the experiment	Experiment duration	Average weight after the experiment	No. of Litters
X	2	85.50 g	6 months'	166.8 g	----------
C	8	84.10 g	6 months	152.4 g	37

As it is appreciate in the tables, comparing the two procreation total numbers of the two lots once the experiment was finished, there is a favorable difference for the lot that received the treatment.

Lot C.-

Male microscopic description (Anatomical-pathologic Diagnosis-APD).

The one receiving the drug shot (APD), presented an increase in number of spermatozoids in the seminal tubes, and also an increase in mitosis and spermatogonia (microphotograph 8).

The control (APD) shows normal spermatogenesis (microphotograph 9).

Lot D.-

Female microscopic description (Anatomical-pathologic diagnosis-APD)

The cuttings of the rat receiving the drug via oral show the ovary, the uterus and the

tube. Contains 14 follicles of Graaf at different maturation stages; seven of them shows a tendency to a light cystic dilatation. The cellular stroma presents moderate vascular congestion. The tube is normal. The endometric epithelium shows a sub and supra-nuclear vacuolization focus as well as an area of stratification. The endometric stroma shows abundant eosidophile cytoplasm cells with a tendency to a delineation of the intercellular bounderies (see protocol 1 and photograph 10).

The cuttings practiced to the rat receiving the intraperitoneal drug shot reveal the ovary, the tube and the uterus. A maturing folicle with cumulus oophorus well constitute, but without ovules, and the antrum shows a pink follicular liqueur. The ovary exhibit two Graaf's follicles of medium and large size, respectively. In these follicles it is not possible to observe any ovule and the follicular liqueur is light pink in color. It is possible to observe also a primordial follicle and two in regression. The swelled endometrium, composed by cylindrical cells, shows a pseudo stratification thickness of four to ten nuclei. These cells have a dense eosidophile cytoplasm with neat intercellular bounderies and a central ovoid nucleus with a homogeneous fine chromatin. In this case the thickness of the endometrium correspond to 2/3 of the uterus wall total thickness (see protocol 2 and microphotograph 11).

The cuttings practiced to the rat receiving the intraperitoneal shot as well as an oral treatment reveal the ovary, the uterus and the tube. Contain 25 Graaf's folicles with six ovules, and shows muscular congestion in the ovary ileus. The uterus presents a swelled endometrium with findings of proliferous type (see protocol 3 and microphotograph 12)

The histological cuts of the control rat reveal the ovary, the tube and the uterus. There are 10 Graaf's follicles, two of them present ovules; the ovary stroma is celular. The tube is normal. The endometrium is composed by a cubic mono-stratified epithelium. (see protocol 4 and microphotograph 13).

II.- There was no spermatogenesis in the frogs treated with the drug.

CHAPTER III

DISCUSSION

1.- The references obtained about the growth of the plant, indicate that it grows in phyto-geographic areas higher than 4,000 m, the puna region in Perú, or according to Weberbauer in the stage known as the graminae steppe. We must say that there is the possibility to grow it at other altitudes.

2.- In the preliminary morphological and taxonomic studies, Velarde (1960) established differences in leaf and root shape of the specimens collected in Perú. Dr. Bolcke, an Argentine specialist on Cruciferae subsequently revised the same specimens and ratified their identification as corresponding to ***Lepidium meyenii*** Walp. This makes possible to suppose the possible existence of varieties within this species.

3.- The preliminary chemical works make to think that the active principle of ***L. meyenii*** was a saponin or a phyto-sterol, but according to the different chemical analysis it is possible to see that the presence of saponins is very scarce. On the other hand, it is notorious the great concentration of alkaloids which number according to the chromatographic test should be three.

4.- The preliminary pharmacological observations have been carried out under the following conditions:

In relation with the animals weight the selected one is 85 g since in the Lima-laboratory nurseries has been observed that with these weights still is not possible to obtain nor fecundation neither procreation in the albino rats. This important acquaintance gives validity to the results that were planned. The case is that a difference in procreation between both colonies as it is observed in the results description favors to the colony receiving the extract. This help us to presume or suspect the presence of a certain property of the active principles responsible for this effect.

On the other hand, in the experiments that conducted us to observe the action of the plant active principles on the genital organs, we obtained an encouraging result according to the findings. So, in relation to the colony working with the administered drug by via oral, the encouraging result obtained in the improved maturation of the Graaf's follicles, reinforce us to consider these findings as promissory ones. In the injected rats, even being the effect positive (maturation of follicles), the preliminary character of this study makes also possible to distinguish what is the cause of the result obtained by via oral. This maybe carry us in future investigations to see what conclusions are obtained in the process of this plant digestion in the way we were administered it. Could it be an enzymatic potential mood?.

These first carried out assays do not allow us to reach final conclusions of the effect. Still we have to find many answers in the studies being carried out. Now we have only sketched them what just serve us to justify the phytochemical study undertook with this plant, what also dispense us from having not submitted so discreet results to a statistical analysis.

In the test carried out with frogs which were intraperitonealy shoot with the alkaloid solution, following a similar technique to that employed in the Galli-Mainini's test, we do not have a satisfactory explanation about the negative results obtained. However, this negative effect indicates incompatibility with the maturation obtained in rats. As long as we do not progress experimentally interpreting the explicative mechanism of this negative

result with the frogs, all are only conjectures.

CHAPTER IV

SUMMARY AND CONCLUSIONS

1.- Morphological, taxonomic and phytochemical observations have been made of the plant known commonly as “maca”, which grows in the puna or gramineae steppes regions of the national territory.

2.- The mentioned species has been identified as ***Lepidium meyenii*** Walp corresponding to the genus ***Lepidium***, family Cruciferae, order Rhoedales, Class Dicotyledons, division Phanerogams.

3.- Photographs and drawings of histological studies and external morphology are included.

4.- In the phytochemical observations of the root have been found great concentration of alkaloids and according to the chromatographic tests they would be in number of three. There have been also found starches, glucides, fatty acids, tannins and in scarce concentration, saponins.

5.- The preliminary observations of the ***Lepidium yemenii***’s alkaloid extract administration to rats and frogs showed the following effects:

a.- Procreation increase in albino rats.

b.- Clear and notable stimulation of follicular maturation also in albino rats.

c.- None effect in the frog induced spermatogenesis.

CHAPTER V

PROTOCOLO AND ILLUSTRATIONS

PROTOCOLO I

SAN MARCOS MAJOR NATIONAL UNIVERSITY
FACULTY OF MEDICINE

PATHOLOGYCAL ANATOMY INSTITUTE

ANATOMOPATHOLOGIC REPORT

Name: Albino rat Age: Sex: female, No. of H.Cl

Pavilion: Bed: Clinic:

Specimen: Organ: Ovary Weight: 65 g

Sample (2) Drug Dr.

MACROSCOPIC DESCRIPTION: The specimen is received in formalin and designate as 'ovary of albino rat'. Consists of two fragments of irregular morphology, white grayish, soft, each one measuring 0.9 cm at their larger diameter. The two fragments were put to test and nominated as A1. It was received too a tubular structure Y shaped, white grayish, soft and 4 x 04 x 0 cm; this part is divided in three segments which are all put to test and named.

MICROSCOPIC DESCRIPTION: The cuts reveal ovary, tube and uterus. The ovary contains a good number of Graaf's follicles of large size most of which look like cystic follicles. There are no ovules in these follicles and the follicular liqueur is pale-pink in color. It is also possible to see a small maturing follicle and several follicles in regression. The tube appears normal. The endometrial epitellium shows sub and supra-nuclear vacuolization foci.

Comment: The histological findings prove a clear and notable stimulation of follicle maturation.

Diagnosis: 1) Cystic follicles, ovary of albino rat.

2) Endometrium of albino rat in focal secretory phase.

3) Tube of albino rat.

Dr. Mario Montes Lima, October 26, 1961

Dr. Alberto Cuba Caparó

PROTOCOLO II

SAN MARCOS MAJOR NATIONAL UNIVERSITY
FACULTY OF MEDICINE

PATHOLOGYCAL ANATOMY INSTITUTE

ANATOMOPATHOLOGIC REPORT

Name: Albino rat Age: Sex: female, No. of II.Cl

Pavilion: Bed: Clinic:

Specimen: Organ: Ovary Weight: 99 g
Sample (3) Shoot with drug Dr.

MACROSCOPIC DESCRIPTION: The specimen is received in formalin and designate as 'ovary'. Consist of three fragments of irregular morphology, white grayish, soft and with the larger diameter oscillating between 0.5 and 1.5 cm; all three fragments are set to test.

MICROSCOPIC DESCRIPTION: The cuts reveal ovary, tube and uterus. The ovary exhibits two Graaf's follicles of medium and large size, respectively. No ovule is observed in these follicles and the follicular liqueur has a pale pink color. It is observed also a primordial follicle and two in regression. In the endometrial empty space it is possible to see an abundant leucocytic exudation. In the endometrial epitellium it is possible to observe small sub-nuclear vacuolization foci. The tube appears normal.

Diagnosis: 1) Ovary with follicular activity, albino rat.

2) Endometrium of albino rat in secretory phase.

3) Tube, albino rat.

Dr. Mario Montes Lima, October 26, 1961

Dr. Alberto Cuba Caparó

PROTOCOLO III

SAN MARCOS MAJOR NATIONAL UNIVERSITY
FACULTY OF MEDICINE

PATHOLOGYCAL ANATOMY INSTITUTE

ANATOMOPATHOLOGIC REPORT

Name: Albino rat Age: Sex: female, No. of II.Cl

Pavilion: Bed: Clinic:

Specimen: Organ: Ovary Weight: 99 g
Sample (1) Control

MACROSCOPIC DESCRIPTION: The specimen is received in formalin and designate as 'ovary of albino rat'. Consist of four fragments of irregular morphology, white grayish, soft and with the larger diameter oscillating between 0.5 and 2.0 cm; all four fragments are set to test.

MICROSCOPIC DESCRIPTION: The cuts reveal ovary, tube and uterus. The ovary exhibits several small Graaf's follicles, two of which contain ovule. The tube appears normal. The endometrial epitellium shows no secretory signals.

Diagnosis: Ovary, tube and uterus, albino rat.

Dr. Mario Montes Lima, October 26,1961

Dr. Alberto Cuba Caparó

NOTA.- A continuación se traducen los títulos de las fotografías de las páginas A-D. Traducciones no se repiten para todas las páginas.

Página A

Cromatografía Central de Alcaloides=Central chromatography of alkaloids

Foto=Photo

Estudio Anatomo histopatológico en Rata albina=Anatomohistological study of albino rat

Testículo=Testicle

Microfotografía=Micro-photograph

Página B

Ovario=Ovary

Utero=Uterus

CHAPTER VI

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NOTA.- Creo que se debe hacer una revisión de la literatura citada ya que presenta muchas irregularidades y al parecer no sigue pautas uniformes, especialmente en aquellas citas en recuadro.