



TRACE ELEMENTS

4501 Sunbelt Drive · Addison, Tx · 75001 · U.S.A.

1273452

LABORATORY NO.:

PROFILE NO.: 16

EQUINE ELEGANCE,

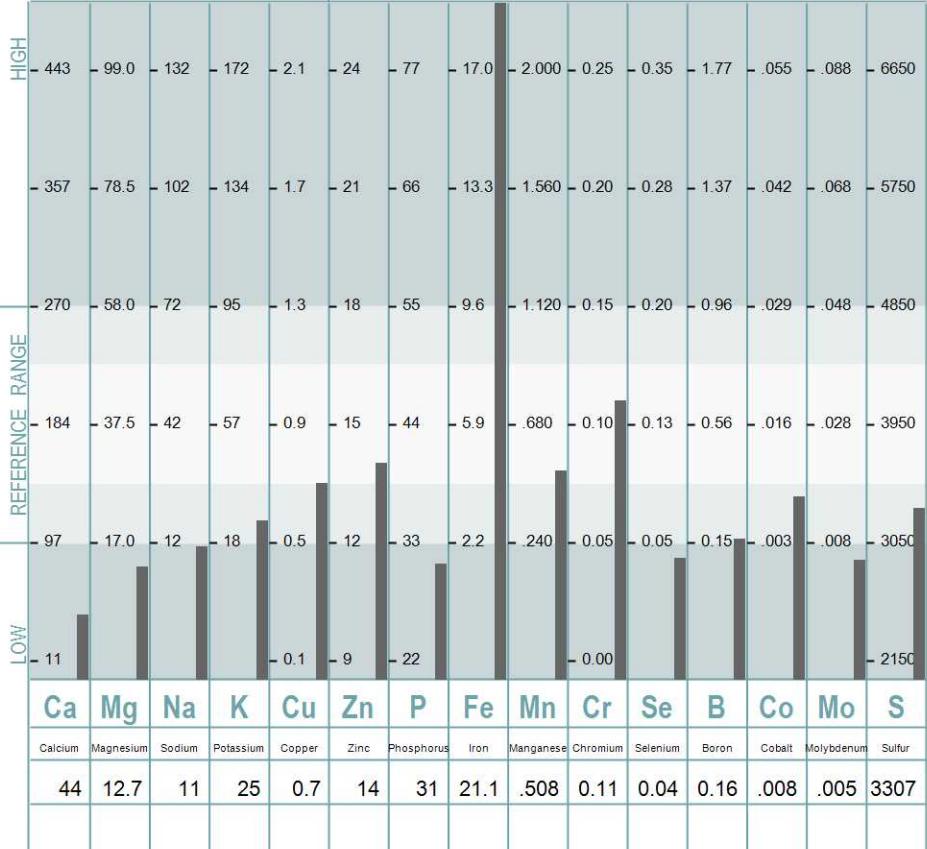
AGE: 14 SEX: MARE

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ACCOUNT NO.: 5862

DATE: 10/1/2015

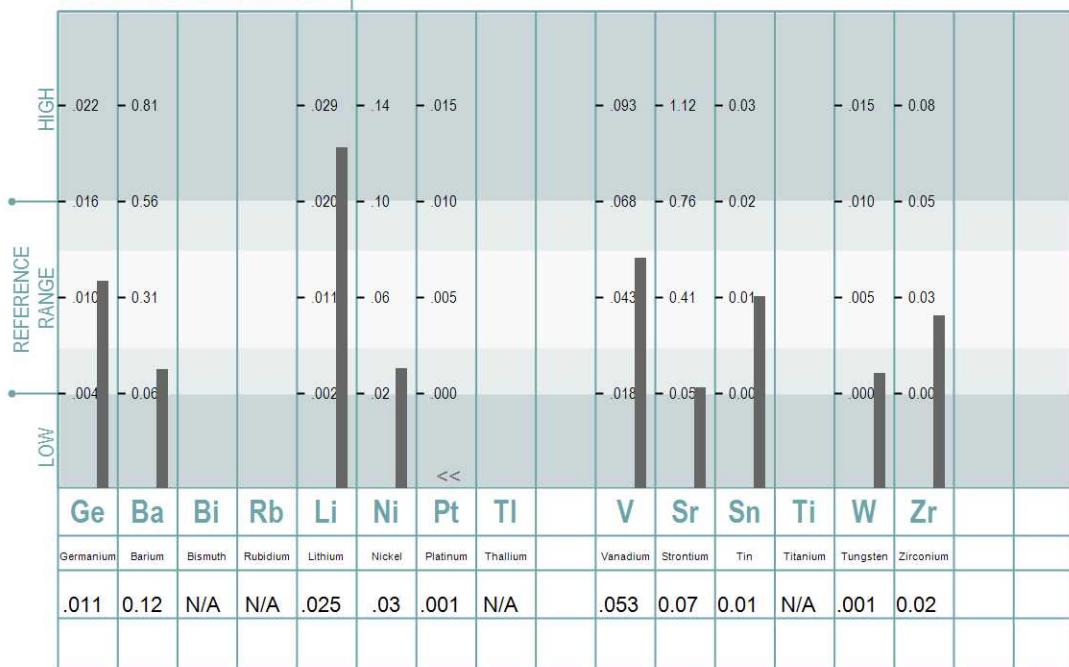
NUTRITIONAL ELEMENTS



TOXIC ELEMENTS



ADDITIONAL ELEMENTS



"<<": Below Calibration Limit; Value Given Is Calibration Limit

"QNS": Sample Size Was Inadequate For Analysis.

"N/A": Currently Not Available

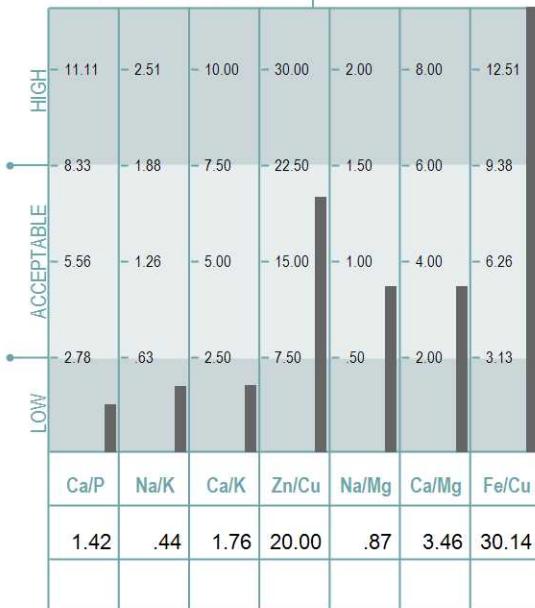
Laboratory Analysis Provided by Trace Elements, Inc.
an H. H. S. Licensed Clinical
Laboratory. No. 45 D0481787

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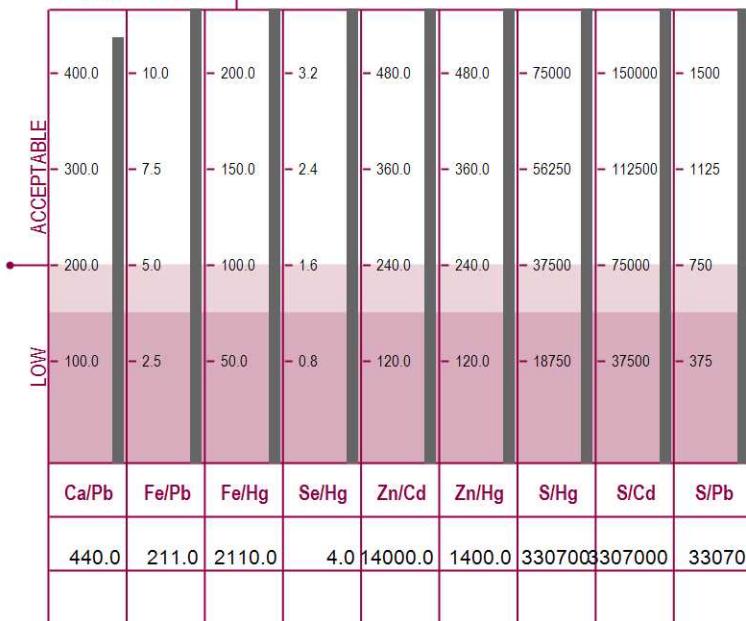
CURRENT TEST RESULTS

PREVIOUS TEST RESULTS

SIGNIFICANT RATIOS



TOXIC RATIOS



ADDITIONAL RATIOS

RATIO	CALCULATED VALUE	OPTIMUM
	Current	Previous
Ca/Sr	628.57	N/A
Cr/V	2.08	N/A
Cu/Mo	140.00	N/A
Fe/Co	2637.50	N/A
K/Co	3125.00	N/A
K/Li	1000.00	N/A
Mg/B	79.38	N/A
S/Cu	4724.29	N/A
Se/Tl	80.00	N/A
Se/Sn	4.00	N/A
Zn/Sn	1400.00	N/A

LEVELS

All mineral levels are reported in milligrams percent (milligrams per one-hundred grams of hair). One milligram percent (mg%) is equal to ten parts per million (ppm).

NUTRIENT MINERALS

Extensively studied, the nutrient minerals have been well defined and are considered essential for many biological functions. They play key roles in such metabolic processes as muscular activity, endocrine function, reproduction, skeletal integrity and overall development.

TOXIC MINERALS

The toxic minerals or "heavy metals" are well-known for their interference upon normal biochemical function. They are commonly found in the environment and therefore are present to some degree, in all biological systems. However, these metals clearly pose a concern for toxicity when accumulation occurs to excess.

ADDITIONAL MINERALS

These minerals are considered as possibly essential. Additional studies are being conducted to better define their requirements and amounts needed.

RATIOS

A calculated comparison of two minerals to each other is called a ratio. To calculate a ratio value, the first mineral level is divided by the second mineral level.

EXAMPLE: A sodium (Na) test level of 24 mg% divided by a potassium (K) level of 10 mg% equals a Na/K ratio of 2.4 to 1.

SIGNIFICANT RATIOS

If the synergistic relationship (or ratio) between certain minerals is disturbed, studies show that normal biological functions and metabolic activity can be adversely affected. Even at extremely low concentrations, the synergistic and/or antagonistic relationships between minerals still exist, which can indirectly affect metabolism.

TOXIC RATIOS

It is important to note that animals with elevated toxic levels may not always exhibit clinical symptoms associated with those particular toxic minerals. However, research has shown that toxic minerals can also produce an antagonistic effect on various essential minerals eventually leading to disturbances in their metabolic utilization.

ADDITIONAL RATIOS

These ratios are being reported solely for the purpose of gathering research data. This information will then be used to help the attending health-care professional in evaluating their impact upon health.

REFERENCE RANGES

Generally, reference ranges should be considered as guidelines for comparison with the reported test values. These reference ranges have been statistically established from studying a population of "healthy" animals.

Important Note: The reference ranges should not be considered as absolute limits for determining deficiency, toxicity or acceptance.

===== INTRODUCTION =====

Hair is formed from a cluster of matrix cells that make up the follicle. During the growth phase of the hair, metabolic activity is greatly increased, exposing the hair to the internal metabolic environment; extracellular fluids, circulating blood and lymph. As the hair reaches the surface, its outer layers harden, locking in the metabolic products accumulated during this period of hair formation, providing a permanent record of metabolic activity. (TRACE SUBSTANCES IN ENVIRONMENTAL HEALTH VIII. Edited by D. Hemphill. Proceedings of the University of Missouri, June 1974)

Determining the levels of the elements in the hair is a highly sophisticated analytical technique: when performed to exacting standards and interpreted correctly, it may be used as a screening aid for mineral deficiencies, excesses, and/or biochemical imbalances. Tissue mineral analysis (TMA) provides the veterinarian and trainer with a sensitive indicator of the long term effects of diet, stress, and toxic metal exposure.

Most deficiencies in animals are brought about by altered relationships of minerals within the body. It has become evident that either the retention or loss of minerals by the animal is equally important as the nutrients consumed from the feed itself. Both appearance and performance can be greatly influenced by adequate tissue levels of essential nutrients due to their effect upon cellular function. Minerals are necessary for several important functions in the growing and mature horse, such as, formation of structural components, enzymatic co-factors, and energy transfer. They are also used in the production of hormones, vitamins and amino acids.

Tissue mineral testing can aid in measuring mineral retention; it may also help to determine which supplements and feeds are required and more importantly, what is not required in order to avoid nutritionally-induced deficiencies or imbalances.

THE TEST RESULTS AND THE REPORT THAT FOLLOWS ARE NOT INTENDED TO BE AND SHOULD NOT BE CONSTRUED AS DIAGNOSTIC IN NATURE, BUT ARE RESEARCH TOOLS FOR THE DEVELOPMENT OF NUTRITIONAL INFORMATION IN ANIMALS. THE INFORMATION GIVEN BELOW IS ONLY INTENDED TO COMPLEMENT CLINICAL OBSERVATIONS AND THUS FACILITATE TREATMENT TO RESTORE OR TO MAINTAIN GOOD APPEARANCE AND HEALTH. THIS ANALYSIS IS NOT INTENDED TO REPLACE VETERINARIAN COUNSEL.

===== ENDOCRINE AND PERFORMANCE INDEXES =====**** ENDOCRINE INDEX ****

The endocrine index is a graphic presentation of the pituitary-adrenal-thyroid relationship, or axis (P.A.T.). These endocrine glands influence energy production on a cellular level and ultimately the performance of the horse. Ideally, there should be a balance within the P.A.T. They need not be at the ideal range as this range is used only as a reference point. However, they should be balanced above, below or at the "ideal" point. A major deviation between the P.A.T. axis can adversely affect the health of the horse. In the performance horse, a major deviation will particularly affect speed and/or stamina.

NOTE:

A "balanced" P.A.T. would appear on the following index with all three bar graphs extending the same length to the right. Ideally, all three would extend to the mid-way point, but as mentioned previously, a balance anywhere within the box is acceptable.



THYROID ACTIVITY AND STAMINA

The thyroid gland regulates the rate of sustained energy production and release on a cellular level. The current mineral pattern of the horse is indicative of elevated thyroid function, resulting in increased stamina and endurance over long distances.

ADRENAL FUNCTION

The adrenal gland produces a number of vital hormones, many of which have an effect upon energy production. Adequate adrenal activity is indicated by the current TMA mineral pattern.

**** PERFORMANCE INDEX ****

The following performance index (P.I.) graphically displays the relationship of the energy producing glands on speed and endurance.

**PERFORMANCE EVALUATION**

The performance index indicates that the thyroid gland is overactive relative to the adrenal glands. This would tend to assure adequate energy production for long distances (endurance), but since the adrenal glands are responsible for quick energy production, speed may be deficient.

===== NUTRITIONAL MINERALS =====**LOW TISSUE CALCIUM LEVEL**

The tissue calcium level is markedly depressed. The following factors may contribute to calcium deficiency:

Low Calcium Intake	Vitamin D Deficiency
Toxic Metal Accumulation	Excessive Vitamin A
High Sodium Intake	High Phosphorus Intake

High Potassium Intake
Increased Sympathetic Neuro-Endocrine Activity

CALCIUM TO PHOSPHORUS (Ca/P) RATIO

Both calcium and phosphorus along with other minerals combine to form the major constituents of bone salts necessary for the maintenance of the skeleton and teeth. A prolonged reduction in calcium retention relative to phosphorus (see low Ca/P ratio) can eventually lead to the skeletal depletion of mineral salts, resulting in weakness of the legs, increased susceptibility to fractures, weakening of the tooth enamel, and enlargement of the facial bones.

FACTORS CONTRIBUTING TO A LOW CALCIUM-TO-PHOSPHORUS (Ca/P) RATIO

Several factors should be evaluated that can contribute to excessive phosphorus retention relative to calcium. The most obvious are feeds high in phosphorus and low in calcium. These include:

Wheat Bran	Cottonseed Meal
Sunflower Meal	Wheat Middlings
Linseed	Torula Yeast
Soybean Meal	Corn (Yellow)
Safflower Meal	Feather Meal

Peanut Meal
Barley
Brewers Yeast
Brewers Grains

Rice Bran
Oats
Milo

If significantly high in the diet, the above feed source should be temporarily reduced. Meanwhile, high calcium to low phosphorus feed and/or extra calcium supplementation should be added at this time.

THE FOLLOWING FEEDS MAY BE INCREASED AT THIS TIME

The following list of feeds have a high percentage of calcium relative to phosphorus and which may be increased until the tissue calcium-to-phosphorus ratio has been improved.

FEED	Ca:P RATIO
Limestone	1000:1
Oystershell	500:1
Citrus Pulp	15:1
Cane (dried)	9:1
Birdsfoot Hay (sun cured)	8:1
Beet Pulp	8:1
Clover, Crimson (sun cured)	7:1
Alfalfa Meal	6:1
Red Clover	6:1
Red Clover Hay (sun cured)	6:1
Straw, Barley	5:1
Clover, Alsike (sun cured)	5:1
Clover, Ladino Hay (sun cured)	5:1
Lespedeza Hay (sun cured)	5:1
Sugarcane Molasses	4:1
Soybean Hay (sun cured)	4:1
Corn Cobs (ground)	3:1

Note:

The mineral content of feeds will vary depending upon different soil conditions. Therefore, this list should only be used as a reference guide.

PICA AND CALCIUM/PHOSPHORUS IMBALANCE

A disturbance in the calcium-to-phosphorus ratio can lead to cribbing and pica, i.e., chewing of bones, wood, etc., which is reduced when the calcium-to-phosphorus ratio improves.

METABOLIC FACTORS THAT CAN CONTRIBUTE TO LOW CALCIUM RETENTION

The following metabolic factors that may be evaluated can contribute to decreased calcium retention:

Stress (Increased Workload)	Parathyroid Disturbance
Vitamin D Deficiency	Excessive Thyroid Activity
Excessive Adrenal Activity	Excessive Vitamin A
Toxic Metal Accumulation	Poor Absorption
Anti-inflammatory Steroids	

VITAMIN D AND CALCIUM DEFICIENCY

A decrease in calcium retention could be the result of a vitamin D deficiency. The evaluation of blood calcium and phosphorus is warranted at this time.

Certain molds in feeds can interfere with vitamin D absorption. Feeds with molds should be avoided.

OTHER FACTORS THAT MAY CONTRIBUTE TO A VITAMIN D DEFICIENCY

Lack of Sunshine

Excess Vitamin A Intake

SIGNS OF VITAMIN D DEFICIENCY

Stiff Joints

Swollen Joints

Fractures

Stiffness of Gait

Bone Softening

Bone Deformities

SOURCES OF VITAMIN D

It is important to make sure the horse spends a few hours in the sunlight each day. While most feeds are low in vitamin D, sun-cured hays are higher in this vitamin. Commercial preparations such as fish oils (cod-liver oil) and concentrates, and irradiated yeast may be added to the feed.

LOW TISSUE CALCIUM AND MAGNESIUM

Magnesium levels will usually fluctuate in sync with calcium. A deficiency of both calcium and magnesium is indicative of an increased metabolic rate via an increase in sympathetic neuro-endocrine activity. Most competitive horses will have reduced levels of the sedative minerals, calcium and magnesium. However, a significant reduction due to a lack of intake and/or increased excretion can contribute to excessive nervousness or a high-strung nature leading to counterproductive performance.

INFECTIONS AND HIGH TISSUE IRON (Fe)

Tissue iron levels may elevate due to inflammatory disorders, arthritis, or an active infectious process, which can indicate an active metabolic disturbance. Upon further serological testing, a low serum iron will confirm the high hair tissue iron level. Serum iron-deficiency may be present if any one or a combination of the above conditions is present.

SOURCES OF IRON

Feeds vary in their iron content depending upon soils, the type of fertilizers used, etc. Generally, legumes and seeds are richer in iron than grains. Meat, fish, and blood meals are probably the highest sources of iron. However, water is often found to be a significant source of iron as well.

Note:

The above sources of possible excessive iron intake should be evaluated and reduced at this time if high in the diet.

IRON (Fe):

Lower quality scissors used in the sample collection process have been shown to contaminate hair specimens, contributing to an artificial and false elevation of iron, and possibly other metallic elements as well. If non-stainless steel scissors were used, the current iron level reported on the test results should not necessarily be considered as fully representative of tissue accumulation, and the above information pertaining to iron should be disregarded.

Note:

According to long-standing laboratory specimen collection policy, it is highly recommended that high-grade stainless steel scissors be used for all sample collection procedures.

SELENIUM DEFICIENCY

Selenium deficiency is known to cause white muscle disease in foals. In the adult animal the signs of selenium deficiency are similar to those of vitamin E deficiency - namely muscle stiffness in the loin area and dark or coffee-colored urine.

MOLYBDENUM (Mo)

The molybdenum level is below the established reference range for this element. Although this mineral is known to activate some enzymes and is involved in purine metabolism and iron utilization through the enzyme, xanthine oxidase, very little is known about molybdenum deficiency. However, deficiency is known to increase the incidence of dental caries. It should be noted that dietary requirements for molybdenum have not yet been established in horses.

===== TOXIC METALS =====

Every horse is exposed to toxic metals to some degree. The retention of these toxic metals, however, is dependent upon the horse's susceptibility. The balance of the protective nutrient minerals within the body in relation to the heavy metals can frequently be the determining factor to this susceptibility. By examining the toxic metal levels in relation to the protective minerals, the extent to which the heavy metals may be involved in abnormal chemistry can frequently be seen.

Hair is used as one of the tissues of choice by the Environmental Protection Agency in determining toxic metal exposure. A 1980 report from the E.P.A. stated that hair can be effectively used for biological monitoring of the highest priority toxic metals. This report confirms the findings of other studies which concluded that hair may be a more appropriate tissue for studying exposure to some trace metals.

ALUMINUM (Al)

Aluminum is found in most plants to some degree, but usually in insignificant amounts. However, aluminum has also been found to be unusually high in some herbs. Excessive aluminum intake can interfere with the absorption of other minerals such as phosphorus resulting in skeletal abnormalities in the maturing horse.

Excessive aluminum exposure and retention can result in lowered serum phosphate, which may be evaluated at this time.

NOTE:

Aluminum brushes and grooming tools can contaminate the hair sample, contributing to an artificial and false elevation of aluminum. If such items are used, the aluminum level reported on the test results should not be considered as fully representative of tissue accumulation, and the above information pertaining to aluminum should be disregarded.

NOTE:

At this time, further confirmation of elevated heavy metal toxicity using a blood test may or may not reveal an elevated level. This is due to the protective response of the body, in which following a toxic metal exposure, the element is sequestered from the blood and stored in various other tissues. Therefore, if the exposure is not ongoing or chronic, elevated blood levels may not be present.

NOTE:

The first step in reducing toxic metal accumulation is to isolate and remove the source. Environmental assessment of chemicals presently being used and testing of the feeds and water supply are suggested.

===== CONCLUSION =====

This report provides a unique insight into the horse's nutritional biochemistry. The recommendations contained within are specifically designed according to individual metabolic type and current mineral status. Additional recommendations may be based upon other supporting clinical data as determined by the attending veterinarian or trainer.

OBJECTIVE OF THE PROGRAM

The purpose of this program is to re-establish a normal balance of body chemistry through individually designed diet and supplement suggestions, enhancing the horse's ability to utilize the nutrients efficiently and resulting in improved energy production and health.

WHAT TO EXPECT DURING THE PROGRAM

The mobilization and elimination of toxic metals may cause temporary discomfort. This can be expected until removal of the excess metal is complete. Temporary modification of the program can aid in reducing the discomfort associated with the mobilization of the metals.

RECOMMENDATION	AM	NOON	PM
SYM-PACK	7	0	7
CALCIUM PLUS	5	0	5
COPPER PLUS	4	0	4
VITAMIN E PLUS	5	0	4

THESE RECOMMENDATIONS MAY NOT INCLUDE MINERALS WHICH APPEAR BELOW THE IDEAL OR IN TURN MAY RECOMMEND MINERALS WHICH APPEAR ABOVE THE IDEAL ON THE TMA GRAPH. THIS IS NOT AN OVERSIGHT. SPECIFIC MINERALS WILL INTERACT WITH OTHER MINERALS TO RAISE OR LOWER TISSUE MINERAL LEVELS, AND THIS PROGRAM IS DESIGNED TO BALANCE THE HORSE'S MINERAL LEVELS THROUGH THESE INTERACTIONS.

THESE RECOMMENDATIONS SHOULD NOT BE TAKEN OVER A PROLONGED PERIOD OF TIME WITHOUT OBTAINING A RE-EVALUATION. THIS IS NECESSARY IN ORDER TO MONITOR PROGRESS AND MAKE THE NECESSARY CHANGES IN THE RECOMMENDATIONS AS REQUIRED.
