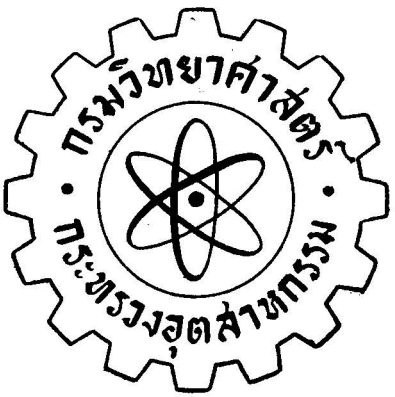
Vol. 8 No. 1 June 1957

THAI SCIENCE BULLETIN

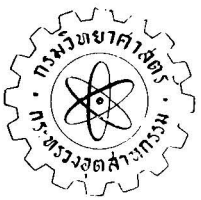


DEPARTMENT OF SCIENCE

MINISTRY OF INDUSTRY

BANGKOK, THAILAND

Vol. 8 No. 1 June 1957



With the Compliments

of

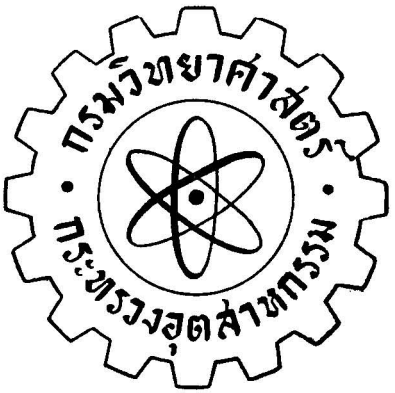
Department of Science

Ministry of Industry

Bangkok, Thailand

Vol. 8 No. 1 June 1957

THAI SCIENCE BULLETIN



DEPARTMENT OF SCIENCE

MINISTRY OF INDUSTRY

BANGKOK, THAILAND

DEPARTMENT OF SCIENCE

Ministry of Industry, Bangkok, Thailand.

Director-General : Dr. Charng Ratanarat.

The Thai Science Bulletin is edited by the Department of Science, Ministry of Industry, Bangkok, Thailand.

It is intended to report the work in all branches of science of the Department and whenever possible those from other scientific institutes in the country.

The Bulletin is issued six-monthly, in June and December.

Papers submitted for publication should be sent to the Editors, Thai Science Bulletin, Department of Science, Bangkok. The contributor's name, address and academic qualification should be given.

For each paper, 25 reprints are supplied free of cost. Additional reprints may be arranged provided the Editors have been notified in time.

Since Vol. 7 No. 1 June 1952 the publication of the Thai Science Bulletin had been suspended. Now circumstances have permitted for it to be resumed. It is hoped that the Bulletin could be published regularly twice a year, in June and December, as originally intended.

Abstracts of some useful scientific articles, which may appear in other publicatious in the country, are also incorporated in this issue as in the last. Original papers of those abstracted, however, may be obtained by direct communication with the authors.

Charng Ratanarat
Chairman of the Editorial Board

THAI SCIENCE BULLETIN

Department of Science
Ministry of Indrustry, Bangkok, Thailand.

Vol. 8 No. 1 June 1957

CONTENTS

PISTOL FIRING TIME

An investigtion to determine the time elapsed after last firings, of an 11 mm. U.S. Army Colt automatic pistol alleged to have been used in connection with the demise of H.M. King Ananda Mahidol of Thailand.

Dr. Charng Ratanarat
Pue Rochanapurananda
Rear-Admiral Sombandhu Bunnag R.T.N.

On June 11th 1956 the Department of Science received a letter, bearing the same date, from the Central Investigation Department together with an 11 mm. Colt automatic pistol No. 2C. 81459, manufactured by the Ithaca Co. Inc., N.Y., requesting that the said pistol be examined to ascertain whether it had been fired, and if so, the time which had elapsed since it was last fired.

A copy of a letter from the Criminal Investigation Division to the Central Investigation Division dated 10th June 1946, stating that the pistol had been found on the bed of the late King Ananda Mahidol on the day of his demise, was also enclosed with the above-mentioned letter.

The pistol was examined on the same day it was received and the Department reported to the Central Investigation Division that the pistol had been fired but that it was not possible, since standards necessary for comparison were not available, to ascertain the period that had elapsed after the last firing.

Since this was a case out of the ordinary, an investigation was undertaken by the Department in which it was endeavoured to establish a method for determining the time elapsed after last firing of a firearm, by chemical tests performed at different periods after firing, on bores of several 11 mm. U.S. Army automatic pistols of the same type and calibre as the exhibit in question.

It was hoped that results obtained would be of value in determining whether the exhibit was the instrument of His Majesty's demise.

Should the findings of such an investigation indicate that the exhibit had not been fired, or that it had been fired last several days prior to the date at which demise of H.M. the King occurred, then the demise of the King could not have been that of suicide but must either have been regicide or due to accidental causes.

Principles of Fire-arms Examination

In examination of fire-arms for the collection of legal evidence, the following features should be noted:–

1) Nature of any residual fouling in bore after firing.

2) Calibre and condition of the fire-arm.

3) Rifling, in the case of rifled bores.

4) Irregularities or imperfections of the bore.

5) Shape of the firing pin and its irregularities, caused either during manufacture or by subsequent handling or wear.

6) File marks, tool marks or other marks on the face of the breech or firing mechanism which might cause identifying imprints on the cap or base of the cartridge.

Normally, most of the physical examinations of fire-arms are performed by the Identification Section of the

Central Investigation Division of the Police Department, but chemical examination to ascertain the nature of residue in the bore for the purpose of determining whether a fire-arm has been fired after its last cleaning is carried out at the Department of Science. Determination, however, of the time elapsed after last firing is usually carried out by comparison. For such comparison, firing tests have to be made, utilizing various types and calibres of weapons and cartridges. Since such material is not available to the Department, such examination is not performed as part of the Department's usual routine work.

There are two types of propellant powder used for fire-arms, namely black powder and smokeless or nitro-powder. Smokeless-powder is, however, the more common propellant for modern fire-arms especially for automatic pistol cartridges.

Smokeless powder falls into two main groups namely double-base powders consisting of nitrocellulose, gelatinised by nitroglycerine, and single-base powders in which nitrocellulose is the active ingredient.

After firing, several gaseous products are formed such as carbon monoxide, carbon dioxide, hydrogen, nitrogen, etc. The solid residues remaining in the bore comprise nitrates, nitrites, etc. The residue in the bore of a fire-arm which has been fired and not been cleaned, will combine with moisture and atmospheric oxygen to cause corrosion of the bore. The extent of this corrosion will, of course, depend on the time elapsed after firing; the longer the time the greater the resulting corrosion.

On the receipt of the exhibit, the general condition of the pistol was immediately examined, and the presence of rust, oil, residues, etc., in the bore was especially noted. Following this examination, a chemical examination of the

bore residues was made on a solution obtained by washing out the bore with hot distilled water; the colour, odour, and general appearance of the solution was noted. Chemical tests comprised tests for nitrites and nitrates. The presence of nitrites can be determined by the Griess-Illosvay's reaction, using sulphanilic acid and α-naphthylamine hydrochloride, which will produce a pink coloration should nitrites be present. The time taken for the development of a colour of a given intensity is a function of the time elapsed since firing occurred.

The presence of nitrates can be determined by the addition of diphenylamine which will produce a blue coloration should nitrates be present. An alternate test to determine the presence of nitrates consists of the addition of phenol-disulphonic acid and ammonia which produces an intense yellow coloration indicating the presence of nitrates.

If tests show both the presence of nitrates and nitrites, it can be concluded that the fire-arm being examined has been fired. If results of tests are positive for nitrites but negative for nitrates or vice versa, it can still be concluded that the firearm under examination has been fired, since on firing, considerable amount of nitrites will be formed, however, due to their instability nitrites will be gradually oxidized to nitrates and eventually disappear. In this investigation, since the primary aim was to determine the elapsed time after last firing of the weapon suspected to have been the cause of His Majesty's demise, by comparison with firing tests performed with similar weapons and ammunition, the amount of nitrates and the change of nitrites into nitrates were of principal interest.

The following results of the findings of this investigation were transmitted to the Police Department.

A. Physical Examination:

When viewed in a strong light the inside of the bore showed considerable rusting; the adherent rust was observed to be located on the lands of the rifling whereas the grooves were comparatively clean.

B. Chemical Examination:

Experiment I

Procedure: Tests for nitrites and nitrates as outlined above.
Results:

	Nitrates	Nitrites	Remarks
1. Distilled water*	negative	negative	
2. Solutions of known concentration (1:100,000)*	positive	positive	Colour developed distinctly in one min.
3. Solution obtained by washing out the bore of the exhibit.	positive	positive	Colour indicating nitrites was faint and took 10 mins. to develop whereas the colour indicating nitrates developed in 2 mins.

**Control test*

Conclusion: The presence of both nitrites and nitrates indicates that the bore of the fire-arm in question has not been cleaned since its last discharge. The fact that the colour indicating nitrites was faint and took 10 minutes to develop, whereas the colour indicating nitrates developed in 2 minutes, indicates that a considerable amount of nitrites has been changed into nitrates. The results of the above physical and chemical tests suggest that the last discharge of the fire-arm occurred some time ago, but it is not possible from the obtained results to determine this period of time.

Experiment II

The following experiment was performed on 11 mm. U.S. Army Colt automatic pistol and type 86 cartridges mark EC 43.

Procedure: Chemical tests for nitrites only were carried out on distilled washings obtained from the bores of the above pistols fired under the 3 following conditions:

Condition 1: Before firing, the bore was not cleaned of oil, a plug of cotton wool being inserted in the muzzle up to the time of firing; within 30 minutes after firing, the muzzle was again plugged with a piece of cotton wool.

Condition 2: Identical firing as in (1) but the muzzle was not plugged with cotton wool after firing.

Condition 3: Before firing, the bore was cleaned and after firing no cotton wool was used to plug the muzzle.

Results:

Condition 1:

	Lapse of Time after Firing	Colour developed from Nitrites	Formation of Rust in the bore
1	8 hrs.	Intense pink colour developed immediately.	Some unburned powder was found. No rust. Cotton wool used to swab out the bore was black.
2	24 hrs.	Pink colour developed immediately and became more intense in 10 minutes.	Cotton wool used to swab out the bore was black. No rust was formed.
3	48 hrs.	Faint pink colour developed immediately.	No rust was found on cotton wool used to swab out the bore.

	Lapse of Time after Firing	Colour developed from Nitrites	Formation of Rust in the bore
4	8 days	Very faint pink colour developed after 5 minutes and became a little more intense after 10 minutes but not very distinct.	Some rust was found on cotton wool used to swab out the bore.

Condition 2:

	Lapse of Time after Firing	Colour developed from Nitrites	Formation of Rust in the bore
1	24 hrs.	Pink colour developed immediately and became more intense after 5 minutes. The intensity of colour after 10 minutes was the same as after 5 minutes.	Some unburned powder was found. No rust.
2	48 hrs.	Faint pink colour developed immediately and became more intense after 5 minutes. The intensity of colour after 10 minutes was the same as after 5 minutes.	Cotton wool used to swab out the bore was black. No rust was formed.
3	14 days	Same as in (2) but the faint pink colour first developed was less intense.	Some rust was found on cotton wool used to swab out the bore.

Condition 3:

	Lapse of Time after Firing	Colour developed from Nitrites	Formation of Rust in the bore
1	4 days	Pink colour developed and appeared distinctly in 5 minutes.	Some rust was found on cotton wool used to swab out the bore.
2	8 days	Faint pink colour developed after 40 seconds and became a little more intense in 5 minutes.	Same as in (1).
3	14 days	Same as in (2) but the faint pink colour developed was less intense.	Same as in (2).

Conclusion :

Results of Experiment II indicate that if tests are performed within 48 hours or 2 days after firing, pink colour indication of the nitrite reaction will develop immediately. If the tests are made 4 days after firing, the pink colour developed will be less intense but can be distinctly distinguished in 5 minutes. Even when 14 days have elapsed after firing, the pink colour still developes but will be rather faint. Small amounts of rust are formed 4 days after firing and the amount of rust formed will increase gradually. No rust, however, will be found on testing a pistol which has been fired only 48 hours or 2 days.

Experiment III

The pistol used in this experiment was fired by the Army Ordnance Department and was tested for nitrites 25 days after discharge. The said pistol after firing was kept in a locality having higher humidity and temperature than normal.

The results of the tests showed that nitrites were absent, no pink colour developing after 10 minutes. The bore of the pistol after this 25-day period was very dirty and rusty.

Experiment IV

Seven pistols were tested in this experiment to determine presence of nitrites and rust formation in the bore after various periods following firing.

Pistol No.	Period after Firing	Colour developed in Nitrite Tests	Rust Formation in the bore
1	2 days	Pink colour developed at the end of 2.5 mins., becoming more intense at the end of 10 mins.	No rust was formed. Only some unburnt powder residue were present.
2	4 days	Pink colour developed at the end of 6 mins., becoming more intense at the end of 10 mins.	Same as for Pistol No. 1.
3	8 days	Faint pink colour developed at the end of 8 mins., becoming more intense at the end of 10 mins.	Rust was formed. No residue of unburnt powder were detected.
4	14 days	Very faint pink colour developed at the end of 10 mins.	Much rust was formed.

Pistol No.	Period after Firing	Colour developed in Nitrite Tests	Rust Formation in the bore
5	18 days	No pink colour developed at the end of 10 mins. Only a very faint pink colour was noticeable at the end of 15 mins.	Same as for Pistol No. 4.
6	21 days	No pink colour developed at the end of 15 mins.	Much rust was formed. Rust also detected in water-washing of the bore.
7	24 days	Same as for Pistol No. 6.	Same as for Pistol No. 6.

Note : Pistol No. 1 and 2 were fired on the same day.

Experiment V

In this experiment, six pistols which had previously been cleaned and oiled but stored with uncovered muzzles were used. They were fired on different days but all were tested on the same day to determine presence of nitrites.

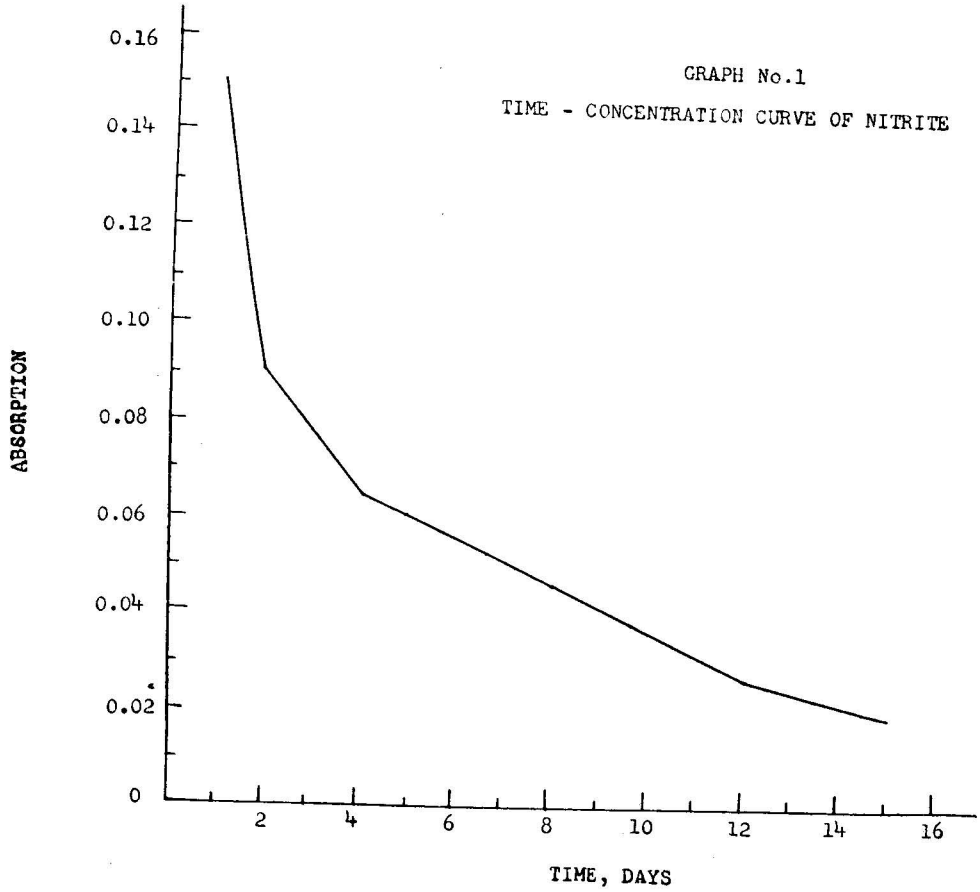
In order to avoid personal error likely to be caused by excessive eye fatigue, colour measurements were made with a Zeiss Pulfrich Photometer.

Test No.	Period after Firing	Absorption
1	1 day	0.15
2	2 days	0.09
3	3 days	0.064
4	4 days	0.045
5	5 days	0.026
6	6 days	0.019

A time concentration curve was plotted as shown by *Graph No. 1.*

GRAPH No.1

TIME - CONCENTRATION CURVE OF NITRITE



Experiment VI

Experiment VI was a repetition of Experiment V but 12 pistols were used being fired in pairs, in order to obtain two readings for each period.

Test No.	Period after Firing	Absorption		Average Absorption
		I	II	
1	2 days	0.42	0.44	0.43
2	4 days	0.387	0.397	0.392
3	8 days	0 375	0.35	0.362
4	12 days	0.37	0.35	0.36
5	16 days	0.345	0.35	0.347
6	20 days	0.34	0.35	0.345

A time–concentration curve was shown by *Graph No. 2*

Summary of Results

The purposes of Experiment II were; firstly, to determine the effect of time after firing on the intensity of the colour developed by the nitrite reaction on residue from bores subjected to the following different conditions :–

(a) Oil present in the bore was not swabbed out before firing, and the muzzle was plugged with cotton wool after firing up to time of testing;

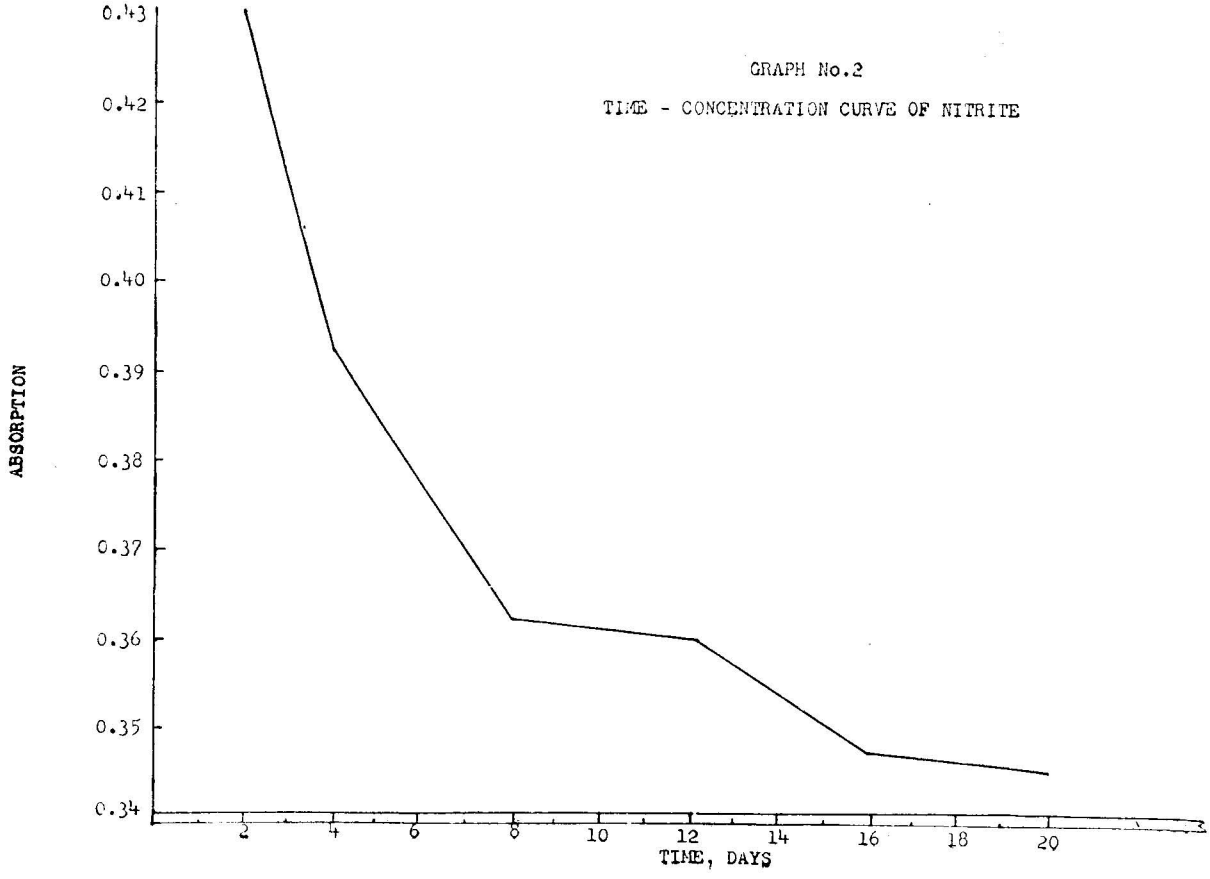
(b) Oil was not swabbed out of the bore before firing, and the muzzle was left open after firing up to time of testing;

(c) Oil present in the bore was swabbed out before firing, and the muzzle was left open after firing up to time of testing;

and, secondly, to determine how time after firing affected rust formation in the bores, treatment of bores before and after firing being as indicated in (a), (b) and (c) above.

GRAPH No.2

TIME - CONCENTRATION CURVE OF NITRITE



The results of these experiments showed that

(1) The pink colour developed by the nitrite reaction was most intense and distinctly observable when the pistol had been recently fired. Measured colour intensity decreased with the time elapsed after firing. Intensity of colour test made 2 days after discharge was strong and distinct and test made even 14 days after firing, gave a pink colour of weak intensity but still detectable.

(2) Swabbing out the oil in the bore before firing had no noticeable effects.

(3) Sealing the muzzle after firing had no noticeable effects.

(4) There was no rusting 2 days after firing. Some rusting was observed 4 days after firing which gradually increased with time.

The purposes of Experiment III were to find out whether nitrites could be detected in the bore 28 days after firing and how much rust would be formed. The firing showed absence of nitrite or considerable rusting of the bore.

The purpose of Experiment IV was to compare the intensities of nitrite colour tests performed on various barrels after a lapse of 2, 4, 8, 14, 18, 21 and 24 days since firing. All pistols were fired in the same day.

It was found that the pink colour developed in the reaction of nitrite was intense and distinct in bores recently discharged, becoming less intense with increase of the time interval between firing and testing. It was also found that the development of colour was prolonged which confirmed the results obtained in Experiment II. Rusting, however, in Experiment IV did not commence until the 8th day.

The pink colour developed 14 days after firing was faint but still apparent, whereas 18 days after firing it took 15 minutes to develop and was very faint. No pink colour was developed in the test on the bore examined 21 days after firing.

Results of this experiment supplement those of Experiment III, to determine how long after discharge the presence of nitrites can be detected in the bore of the pistol.

The purpose of Experiment V was to investigate the nitrite colour reaction performed on pistols fired on different days but all tested on the same day. In this experiment a Pulfrich photometer was employed to measure intensities of colour instead of visual observation as was the case in the other tests. It was found that colour intensity measurement with the Pulfrich photometer was more precise than estimation by the naked eye. The results in this experiment confirmed the findings of previous experiment.

The object of Experiment VI was to substantiate Experiment V and a greater number of pistols were used. Pairs of pistols were fired in each test and the average of individual readings was taken. Results of this experiment substantiated Experiment V, although the absorption figures were higher than Experiment V. This can be accounted for by the fact that in Experiment VI, owing to the faintness of the colour developed, a stratum length of 20 mm. was employed in the measurement of absorption instead of the stratum length of 10 mm. used in Experiment V.

Conclusions

In the above investigation undertaken by the Department of Science to determine the time of the last firing of a given pistol, alleged to have been the instrument causing

the demise of H.M. King Ananda Mahidol, it was concluded that the exhibit was last fired prior to the 9th of June 1946, the day of His Majesty's demise, and at least 8 days prior to the day of the receipt of the exhibit for examination by the Department.

It is to be noted that the publication of this investigation was withheld pending the final decision of the Supreme Court.

Acknowledgement

The Department wishes to thank the Ordnance Department of the Thai Army for lending several pistols used in this investigation.

The pink colour developed 14 days after firing was faint but still apparent, whereas 18 days after firing it took 15 minutes to develop and was very faint. No pink colour was developed in the test on the bore examined 21 days after firing.

Results of this experiment supplement those of Experiment III, to determine how long after discharge the presence of nitrites can be detected in the bore of the pistol.

The purpose of Experiment V was to investigate the nitrite colour reaction performed on pistols fired on different days but all tested on the same day. In this experiment a Pulfrich photometer was employed to measure intensities of colour instead of visual observation as was the case in the other tests. It was found that colour intensity measurement with the Pulfrich photometer was more precise than estimation by the naked eye. The results in this experiment confirmed the findings of previous experiment.

The object of Experiment VI was to substantiate Experiment V and a greater number of pistols were used. Pairs of pistols were fired in each test and the average of individual readings was taken. Results of this experiment substantiated Experiment V, although the absorption figures were higher than Experiment V. This can be accounted for by the fact that in Experiment VI, owing to the faintness of the colour developed, a stratum length of 20 mm. was employed in the measurement of absorption instead of the stratum length of 10 mm. used in Experiment V.

Conclusions

In the above investigation undertaken by the Department of Science to determine the time of the last firing of a given pistol, alleged to have been the instrument causing

the demise of H.M. King Ananda Mahidol, it was concluded that the exhibit was last fired prior to the 9th of June 1946, the day of His Majesty's demise, and at least 8 days prior to the day of the receipt of the exhibit for examination by the Department.

It is to be noted that the publication of this investigation was withheld pending the final decision of the Supreme Court.

Acknowledgement

The Department wishes to thank the Ordnance Department of the Thai Army for lending several pistols used in this investigation.

Rapid Examination of Tin by Casting and Bending

Vongse Naewbanij A.A. (Sto. Tomas)
Department of Science, Ministry of Industry

During the Second world War commerce and communication between Thailand and the Western World came almost to a standstill. Soon after the Japanese occupation the demand for metallic tin in the local market was gradually felt. When it was realized that tin metal itself was an excellent form of security, the gravity was all the more striking. Thailand for the first time had to smelt her own tin smelting plant, primitive as they were, could be seen sprouting all over the city of Bangkok and its suburbs.

At the Department of Science, the amount of samples sent for analysis during the period was unusually enormous. The standard method as applied prior to the introduction of this method of tin examination was to determine chemically various impurities such as copper, lead, antimony, iron, bismuth, arsenic, etc., and the percentage of tin was arrived at "by difference". Such method was tedious and time consuming.

As required by consumers tin could be graded viz: A, B, and C :–

Grade A : High purity tin, 99.9% and over.
Grade B : Standard (Saleable), 99.5% and over.
Grade C : Low grade pig tin, lower than 99.0%

Those qualities between B and C were rarely offered for sale since prices would depreciate uncorrespondingly and

moreover it was not too laborious for the producer to improve them by further purification.

With the exception of few ores from lode mines from which ingots obtained were of "incurable" low grade, the main bulk of ores that came to the smelting plants at that time were of alluviul nature. The ingots obtained were considered fairly pure and the percentage of impurities was usually low.

Thus in most cases only a narrow range of tin purity i.e. between 99–100% was the the main concern. From the consumers' requirements it could be seen that the amount and exact nature of various impurities present were not considered. Owing to acute shortage of necessary chemicals and the lack of modern analytical instruments, it seemed very appropriate to resort to a simple means of examination, the casting and bending tests. The method to be described, however, was inapplicable in the case of low grade pig tin and the "by difference" or other convenient methods should be applied. The rapid method introduced was then valuable in the control work in smelting and purification, and served effectively well our purpose.

The casting and bending methods of tin examination were based on the fact that different impurities exert varying influences upon pure metal with regard to their physical and mechanical properties.

Casting Test

The mould used was of the size 6×3×1 in., with its top face planed out, *Fig. 1.* The melt was carefully poured in at one corner and left to solidify, preferably in still air. The slab of metal $5\times2\times\frac{1}{4}$ in. in size obtained provided its

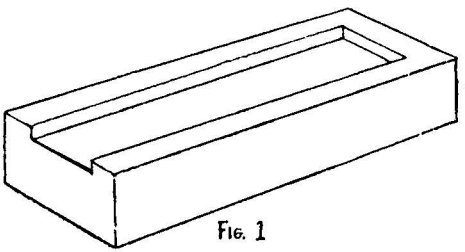


Fig. 1
Casting Mould

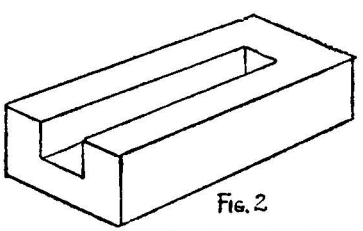


Fig. 2
Bending Mould

surface area large enough to study. It was also found that the surface study by casting test alone might be misleading and it was essential to perform the supplementary bending test.

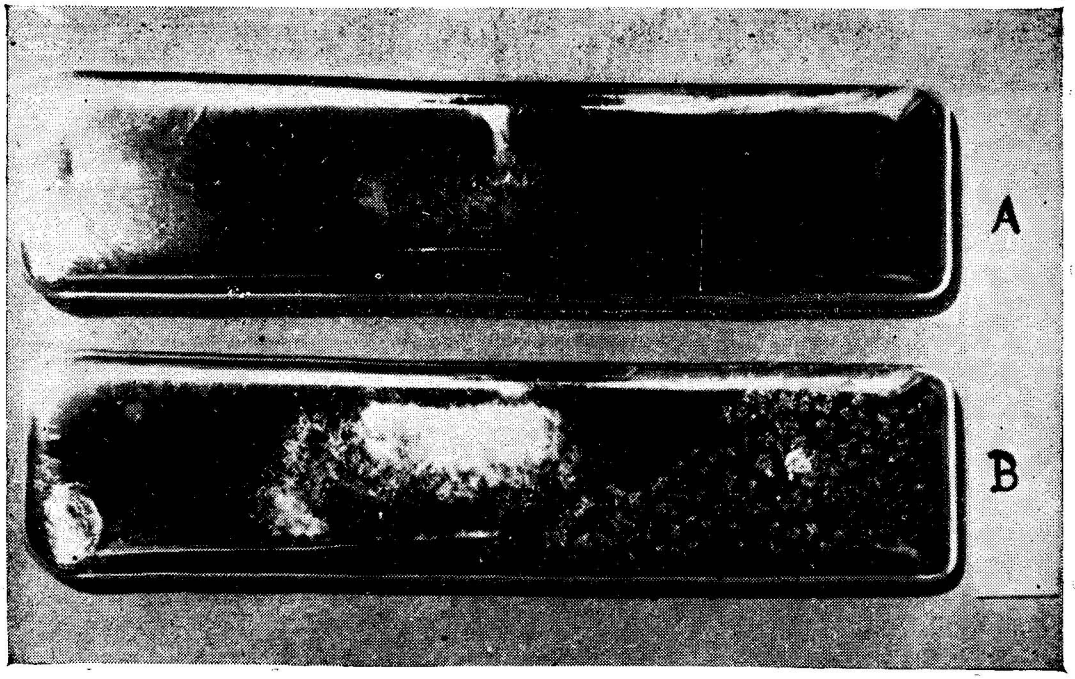
Bending Test

The mould of the size $4\times2\times\frac{1}{2}$ in. with an area of depression made so as to obtain a rectangular block of metal of the size $3\times1\times\frac{4}{5}$ in. was employed, *Fig. 2.* The test was made by punching a wedge accross its surface at the middle of the test block making a groove about $\frac{1}{3}$ in. deep and then bending it double with the aid of a vice and a plier. By this means the grained inner surface was exposed and could be critically examined. Grooving could also be obtained by shaping machine instead of punching by a wedge. But since both methods produced completely comparable grained textures, punching, being the easier of the two, was, therefore, preferred.

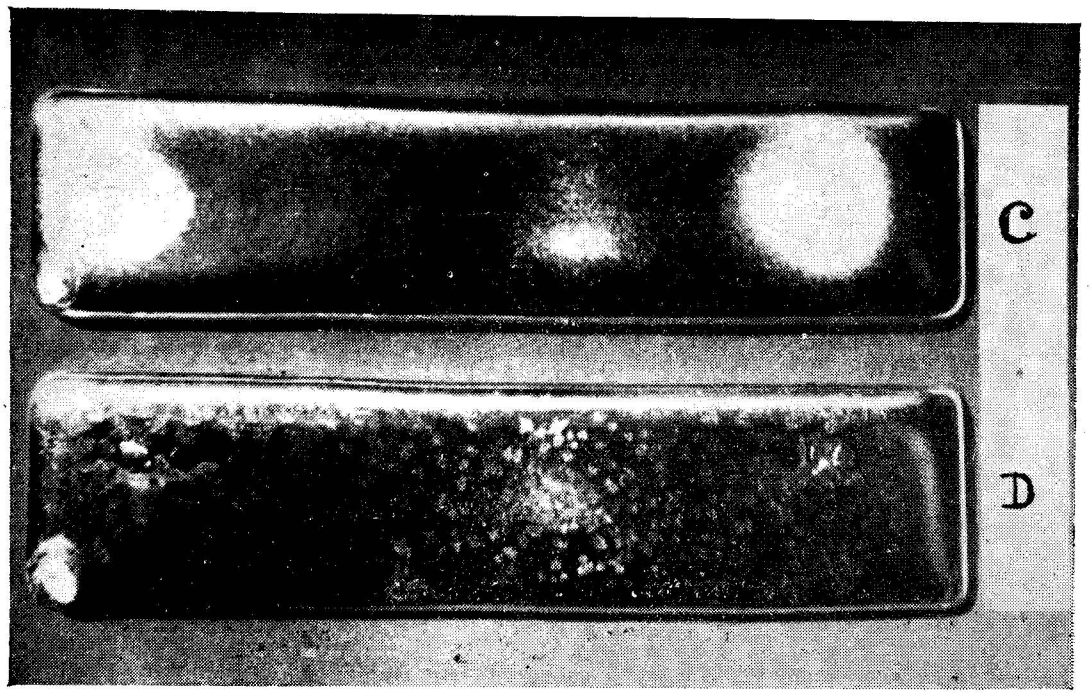
Observation

Apart from the usual shrinkage of approximately 4% by volume on solidification, tin of high purity (99.9% and over) exhibits a very clear and shiny mirror surface. The manifestation of patches or frost or other irregularities depends upon the nature of impurities, the extent of these irregularities is a good indication of the degree of contamination. *(See photographs A, B, C, and D)*

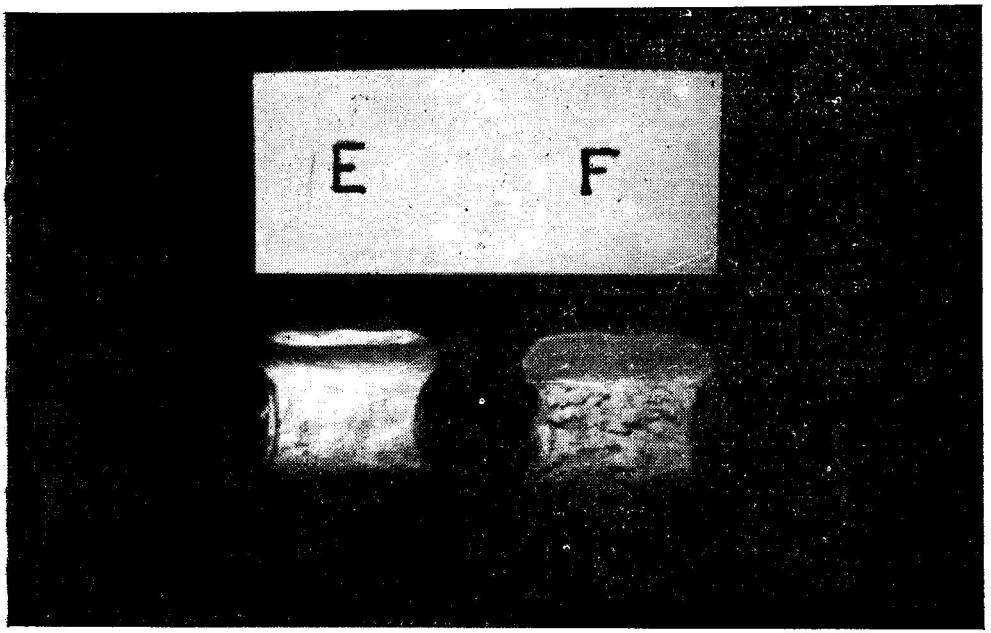
In the Bending Test of high purity tin (99.9% and over) the exposed texture shows striking homogeneity without any sign of "split" or flaw. In the samples of lower purities the exposed inner surfaces generally exhibit certain amounts of flaws and defects, the extent of which provides a good indication of the degree of contamination. *(See photographs E, F, G and H)*



A. Test piece showing a clear mirror surface of Tin 99.9 + %
B. Test piece showing a typical composite surface of Tin 99.7 % with frosts and cubes on its mirror surface.

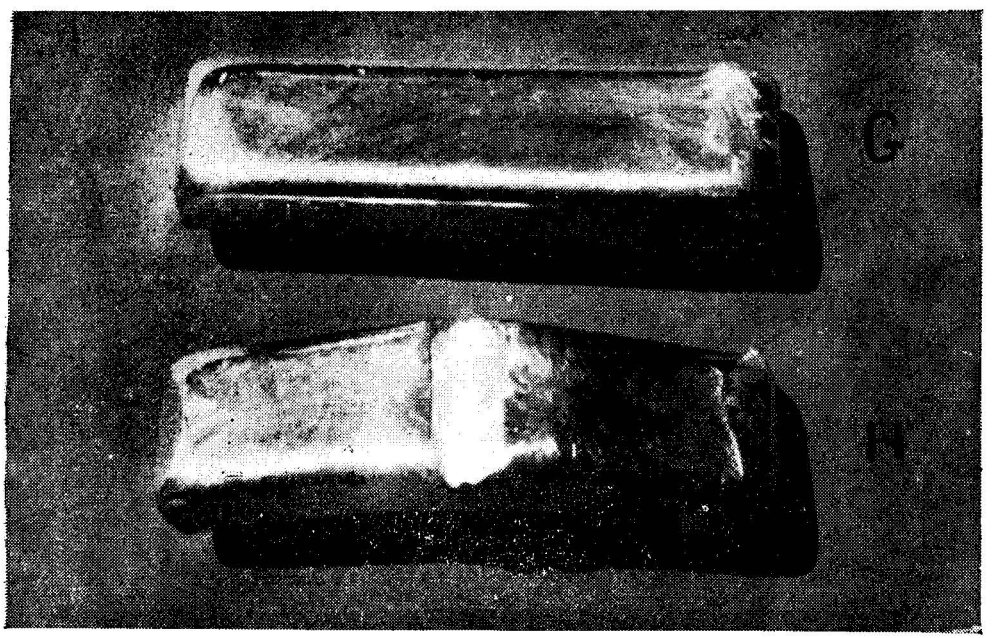


C. Tin 99.4 % with Copper being the main impurity showing the needle crystals on its surface.
D. Tin 99.5 % with Antimony being the main impurity showing its cubical structure crystals.



E. Test piece showing tin crystals in plastic state and the smooth "grain –break" of tin 99.9 + %

F. Tin 99.5 % with its splits or flaws seen at the "grain–break" showing a typical combination of impurities dominated with iron.



G. and H. Showing 2 stages of the test piece in preparation for bending test.

In estimating the percentage of a tin sample both the cast surface appearance and the exposed texture by the Bending Test are noted and compare with those of standards, which had previously been analysed chemically. Generally the Casting and Bending Tests agree very satisfactorily, but in some cases where impurities are mostly copper or iron the Bending Test gives higher results than those obtained by the Casting Method. After a few experiments the technique could be readily mastered.

For tin metal of purity within the range of 99.5% and over this rapid method by Casting and Bending, therefore, affords a ready and effective means of examination without having to resort to long and tedious chemical analysis.

ABSTRACTS

Radio-Active Minerals from Tin and Tungsten Mines in Thailand (in English)

P. Aranyakanond and Chana Nilkhuha. Department of Mines, Bangkok.

Report of Investigation No.1, 1955, p.41, The Department of Mines.

A preliminary study was made on tailings resulting from tin and tungsten ore dressings of various mines. Uranium, columbium, tantalum, thorium, cerium and other rare earth oxides were found in many of the samples.

Y.B.

★

Physical Features, Geology, and Climate of Thailand (in English)

Thailand Nature and Industry, issued by the Department of Commercial Intelligence, Ministry of Commerce, Bangkok, 1951.

Authoritative accounts on the respective subjects were provided and approved by the Royal Survey Department, the Department of Mines, and the Royal Navy Meteorological Department, Bangkok, Thailand. Maps, charts, and climatological data were also included.

Y.B.

★

Preservation of Rice Bran (in Thai).

Sakuntala Bhodhiprasart, Department of Science.

Collected Papers, Science Conference 1950, p.184, Science Society of Thailand.

By extracting fat from the freshly milled rice-bran by means of solvents such as petroleum ether or hexane, it was found that the bran's quality was well preserved and did not become rancid on storage. After four month's storage the treated bran was found to contain only the original content of 2.5 percent free fatty acids.

Y.B.

★

Vitamin A Content of the Local Shark Liver Oil (in Thai).

Bundham Sundharagiati, Chulalongkorn Hospital.

Collected Papers, Science Conference 1950, p.128, Science Society of Thailand.

A study of potency of vitamin A was made on the local shark liver oil, obtained from sharks found in the gulf of Thailand, by means of biological assay on albino rats. Results were consistently higher than that of foreign cod liver oil. Chemical estimation substantiated the biological findings. Some samples showed potency to be as high as 29,000 units per gramme.

Y.B.

★

Lignite Prospecting (in Thai).

Vicha Sethaputra and Payoam Arunyakanonth, Department of Mines.

Collected Papers, Science Conference 1951, p.1, Science Society of Thailand.

Lignite prospecting was carried out at Mae Moh basin, east of Lampang Province, northern Thailand, using Mobile Drill. High-grade lignite was found occurring in the Tertiary structural basin covering an area of 32.5 square kilometres, assuring the presence of at least two seams of lignite with a reserve of 300,000 tons.

Y.B.

Tamarind Pulp in Tobacco Industry (in Thai).

Miss Sompan Saropala, Thailand Tobacco Monopoly.

Collected Papers, Science Conference 1951, p.50, Science Society of Thailand.

The pulp of tamarind (Tamarindus indica L.) can be obtained in large quantities locally. Uses were made of its high contents of invert sugar 28–34 percent and tartaric acid 3.8–5.0 percent. The invert sugar was extracted and fermented to produce alcohol by pure cultured yeast; while tartaric acid was separated from the fermented waste liquor by precipitation with calcium hydroxide and calcium chloride. The yields in both cases were satisfactory.

Y.B.

A Study of Elephant's Placenta (in Thai).

Sood Sangvichien, University of Medical Sciences.

Collected Papers, Science Conference 1951, p.65, Science Society of Thailand.

The study was made on placenta attached to an aborted foetus of an elephant (Elephas Indicus) in the last stage of pregnancy. That the elephant and Procavis Capensis have placentae of the same type, as reported by Wislocki in Carnegie Inst. Wash., Vol. 28, pp.65–88, 1940, was not substantiated by this study. The external appearance of the placentae of the two animals may be the same but differ widely in their finer structural details as seen in the relation and development of chorionic villi and maternal blood lacunae.

Y.B.

★

Flowering Time of Rice (Oryza sativa).

Phit Panyalakshana and Rapee Sacrik, Department of Agriculture.

Collected Papers, Science Conference 1951, p.102, Science Society of Thailand.

30 varieties of local rice were studied with regard to flowering time. The experiment was conducted in flower pots and results were recorded on graphs. Flowering time of some late varieties was observed to be independent of age, starting to flower at a fixed calendar date irrespective of the time of sowing; while in other varieties the age of the rice plant determined the time of flowering. A means was also developed to provide a method for producing simultaneous flowering of different varieties by simple inference on the plotted curves.

Y.B.

Fertilizer and Food Value of Some Thailand Crops and Products (in English)

Compiled by Bancherd Balankura, Department of Agriculture. With the co-operation of E.V. Staker, Soil Advisor, USOM. 1958, 23 pages.

Analytical data were given for convenience under three separate headings: Fertilizers; Compost and Composting Materials; and Human and Animal Foods. The work represented many years of chemical analysis undertaken by Division of Agricultural Chemistry, Department of Agriculture, Bangkok, Thailand.

Y.B.

PRINTED AND PUBLISHED BY
THE POLICE PRINTING PRESS
BANGKOK, THAILAND
NOVEMBER 1957