



Long Life for Lead Water Services in Many Cities

Syracuse, Allentown and Clarksburg Among Cities Where Lead Pipe Has Served Well

SYRACUSE, N. Y., Allentown, Pa., and Clarksburg, W. Va., all are lead pipe cities so far as water services are concerned. They are cities of varying size and conditions situated in different parts of the country, yet all three have found that lead pipe has served them well for many years and continues to do so.

Of the 40,000 water services in the city of Syracuse, from 25,000 to 30,000 are entirely lead. With this large number of lead services in the ground, the Water Department, whose experience runs back to 1893 when it became a municipal system, has no record of failures of lead pipe except where caused by some unusual mechanical injury or improper workmanship, and even these are small in number. Although its records do not go back more than 41 years, the Department knows that a great number of lead services were installed before that time and are still doing their jobs without signs of trouble after 50 or more years.

Services from the street main to curb are installed by the Syracuse Water Department and from curb to house by the plumber. So sold on lead are the plumbers of Syracuse that they will install practically nothing but lead. The performance of lead service pipe in Syracuse is even more remarkable because soil conditions in many parts of the city are rigorous due to large salt deposits in the neighborhood and the number of industrial and chemical plants in the city which probably cause pollution of the ground water.

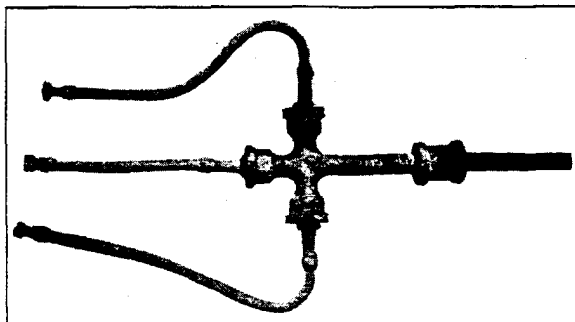
There are approximately 23,300 water services in Allentown, Pa., of which more than 20,000 are



EWING GALLOWAY
Filter plant and lighting plant, Syracuse, N. Y.

lead. Practically all services 2 in. and under are lead pipe while those over 2 in. are cast iron jointed with calked lead. The distribution system is cast iron pipe with lead joints. The population supplied with water by the Allentown Bureau of Water is about 95,500. Pressure on the mains runs from 27 to 103 lb. and the average on city services is 57 lb.

According to Mr. W. R. Schnabel, superintendent and engineer of the Water Bureau in Allentown, these materials have given completely satisfactory service. Water distribution in Allentown was originally undertaken by a private company in 1811 and was taken over by the city in 1869. Lead and cast iron pipes have been used throughout the entire 123 years and many of the original pipes are still in good condition in the ground. An accompanying photograph shows the method of taking a large service off a main with small tapplings. This connection was recently dug up in the center of the city in excellent condition as the photograph shows and is estimated to be about 60 years old. Mr. E. D. Swoyer, one of Allentown's leading plumbers, has some old driven ferrules to which lead pipe is attached, both pipe and joint being in perfect condition and estimated to have been in the ground some 80 years. Such remarkable service from lead pipe and lead calked cast iron pipe has convinced the water department that it would be unsound economy to use any cheaper materials. Mr. Schnabel, in common with many other experienced waterworks officials, believes that because the cost of material is only part of the cost of installation and because lead and lead-calked cast iron require

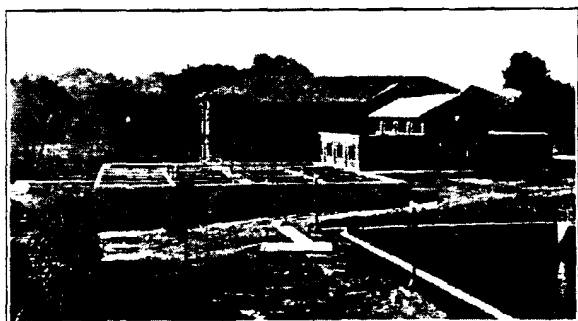


COURTESY ALLENTOWN BUREAU OF WATER
Excellently preserved lead connections for large water service after 60 years in the ground.

so little maintenance, it is more economical to adhere strictly to the use of these durable metals.

In Allentown, the Water Bureau exercises jurisdiction over the materials to be used for water services and taps the mains, but all services are laid by plumbers.

Clarksburg, W. Va., is "truly a lead pipe city" in the words of Mr. Scotland G. Highland, secretary and general manager of the Clarksburg Water Board. The city has approximately 6,000 lead water services serving a population of about 34,000. They have been used continuously by the Water Board since 1889 and by Mr. Highland since 1906. Many of the original lead services are still in use. Clarksburg also employs lead for jointing cast iron mains.



Filter plant, Allentown, Pa.

KNAUSS

Service pipe practice of the three cities described here is selected as typical of many cities of all sizes and locations in the United States. Though the first cost of lead services may be slightly higher than other materials, the long record of excellent performance of lead and the low maintenance cost of lead services everywhere more than justify the slightly increased initial cost. Lead services eliminate most of the future tearing up of expensive pavements and lawns, as well as pipe renewals. Wiped joints provide positive connections, not subject to loosening by vibration or other causes as are threaded connections, and it is a known fact that unaccounted for water is lower where lead services are used. Good will of consumers is also protected by the use of lead because the inconvenience and expense of interruptions to supply are practically removed and lawns are safe from digging up.

In short, the use of lead service pipe assures a city of a definite performance based on years of experience with this kind of pipe, eliminating all chance and conjecture. At the same time, it is safe to say that the annual cost of lead services, figuring in first cost, maintenance and length of life, is lower than for any other service pipe material.

Red Lead is Standard in French Paint Tests

WRITING in the French technical magazine, "*Le Genie Civil*," M. F. Chaudy, honorary chief engineer of the Chemin de fer du Nord, outlines a simple test for the adherence of paints to metal, using red lead as standard.

Two strips of metal were painted, one with red lead and the other with another paint commonly recommended for use on metal. A single coat of paint was used. The red lead paint was composed of 78.80 per cent red lead, 20.24 per cent linseed oil and 0.96 per cent mineral spirits. Five needle scratches, 50 mm. apart, on the edge of each specimen, measured elongation.

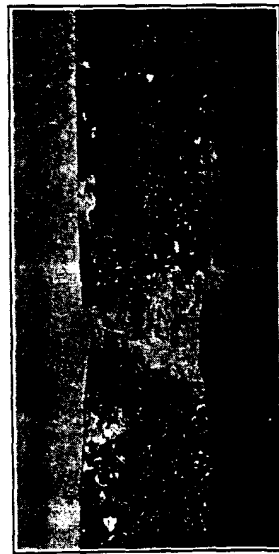
After the paint dried, the specimens were pulled on a tension machine. The accompanying photographs show the results, the red lead paint scarcely cracking or scaling even with an elongation of 22 percent, whereas the other paint cracked and scaled badly.

It is M. Chaudy's thought that, taking red lead as standard, this test may be used to determine the adherence of any paint. A metal specimen may be painted on one side with red lead and on the other with any paint to be tested. After pulling, photographs of the two faces will serve as a record of the comparative merits of the paints in this respect.

From the results of M. Chaudy's tests, it would appear that no paint can surpass red lead in toughness and adherence.

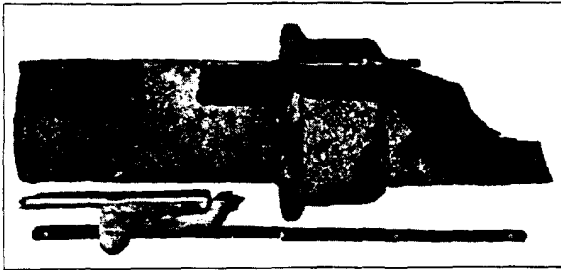


Red lead painted panel after elongation. Note practically unbroken, adherent paint film.



COURTESY LE GENIE CIVIL
Panel painted with another common paint. Note broken and scaled paint film.

Century-Old Lead Joints in Water Mains Not Uncommon



COURTESY U. S. PIPE & FOUNDRY CO.

Section through lead joint in century-old cast iron pipe from Philadelphia.

IN Philadelphia, more than one cast iron water main has lead joints over a century old. Reproduced here is a photograph of one laid in 1817 with the lead joints still in good condition when it was uncovered in 1931. In Boston there is a cast iron main with lead joints more than 85 years old. A cast iron main in Richmond, Va., was laid in 1830 and the records of the Department of Public Utilities in that city show that no leaks have developed in the line, which was laid with cast lead joints. St. Louis has a cast iron main with lead joints laid in 1831 and the joints are still apparently in good condition. Other cast iron mains with lead joints a century or more old in Philadelphia and New York were described in LEAD, May and July, 1932. There are, of course, many more such old installations wherein lead joints, as well as the pipe, are good after many years of service.

When cast iron mains are laid they are expected to last a hundred years and more because replace-

ments mean, in addition to pipe, such expensive items as tearing up and relaying pavements. No main, however, can be any better than its joints. It is folly then to put cast iron mains in the ground with jointing materials that have not been thoroughly tested over a period as long as the pipe is expected to last. Numerous installations like those cited above prove beyond a shadow of a doubt that lead joints may be expected to give service comparable to the pipe itself and it is the only jointing material for bell and spigot pipe with such a record.

It is true that lead joints cost more but the additional cost is a very small proportion of the total cost of a water distribution system and is certainly well worth while to prevent endangering the usefulness of the remaining large part of the investment.

Aside from the known fact that lead joints give satisfactory service throughout the life of cast iron bell and spigot pipe, there are many reasons which justify its choice over cheaper substitutes. Impartial tests on deflection of pipe joints indicate that substitutes crack and spall and become unsatisfactory as water carriers with much less deflection than lead joints can stand and remain tight. This is of utmost importance because practically all mains are subjected to deflection due to ground subsidence. The flexibility of lead joints also prevents undue strain being placed on the pipe itself and removes dangers of pipe fractures which may be caused by too rigid joints.

If lead is the joint material and leaks do occur, they are easily repaired by simple caulking. Sub-



←
Cast iron water pipe with cast lead joints laid in 1817 in Philadelphia.

→
Eighty-five year old lead-jointed cast iron pipe in Boston.



PHOTOS COURTESY U. S. PIPE & FOUNDRY CO.

stitutes must be completely removed and joints remade, which means that water must be shut off during repairs. There is no danger that lead joints

will become porous through the action of sulphur oxidizing bacteria contained in water because there is no sulphur in caulking lead.

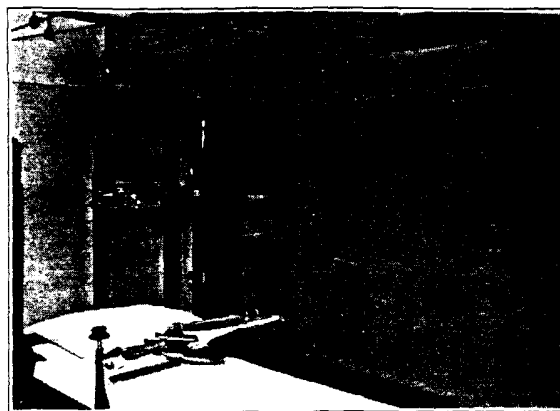
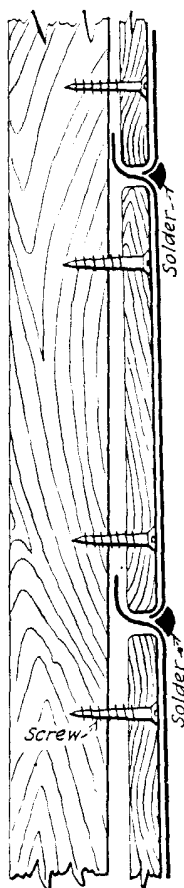
Lead Work a Boon to Important Plumbing Concern

X-RAY rooms in the Englewood, N. J., Hospital are completely lined with 10,000 lbs. of 16-lb. lead. As the lead is not plastered over but is simply painted and forms the finished wall, the workmanship in installing the lead had, naturally, to be unquestionable. These lead linings were placed in 1925 by John A. Grahm, Inc., of Tenafly, N. J., and the photograph, taken in 1933, shows the excellent condition of the walls today. The lead was placed over boards running horizontally and screwed to the studs. The sheets turn over the upper edge of each board and behind the board above. Each sheet was then soldered to the sheet below. In this way the lead is held securely in place without being punctured at any point, so X-rays have no opportunity to penetrate.

This firm believes strongly in the tradition of good craftsmanship inaugurated by its founder, the late John A. Grahm, and it requires that its mechanics be thoroughly versed and capable in any material a plumber may have to handle so that they may assure the building owner of getting a good job under any circumstances. Naturally, craftsmen of this type are partial to lead. They feel that lead working is a protection for both home owner and plumber against inferior mechanics and materials. That this viewpoint is correct is best exemplified by the fact that John A. Grahm, Inc., has averaged about \$275,000 of business a year over a period of years, despite its location in a comparatively small suburban community.

An example of the craftsmanship of the late John A. Grahm, the founder, is the fact that, at the age of 62, and 22 years after

Method of installing sheet lead on X-ray room walls, Englewood (N. J.) Hospital.



Lead-lined X-ray room, Englewood (N. J.) Hospital, finish painted directly on lead.

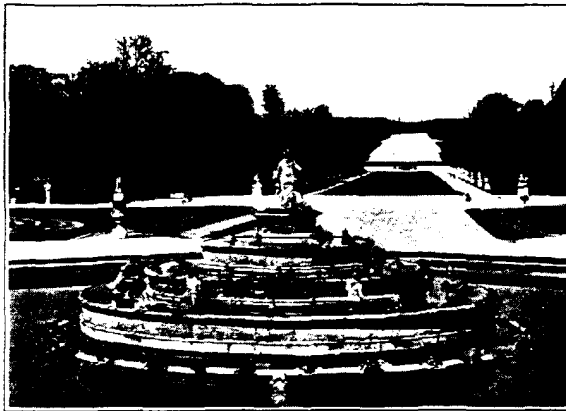
he had last wiped a joint, he appeared before the examining board in Plainfield, N. J., to obtain a license in connection with a job there. The board was willing to waive the practical part of the examination out of deference to Mr. Grahm's age, experience and reputation. Nevertheless, he took the practical test and the wiped joint he made was so perfect that it was kept on exhibit for several years thereafter in the Plumbing Inspector's Office in Plainfield.

At the time of Mr. Grahm's death, Mr. Aymar Embury II, noted architect, wrote a communication to the Englewood, N. J., Press in which he not only eulogized Mr. Grahm personally, but his craftsmanship as well. Mr. Embury stated that he often leaned on Mr. Grahm for information, advice and intelligent execution of work, and that the community had been deprived of a master craftsman who never failed in his relations to his fellow citizens.

The two journeymen who made the installation at the Englewood Hospital, Roy Terhune and Henry Gruben, both skilled lead workers, are still employed by John A. Grahm, Inc.

Plumbing contractors everywhere can profit by the experience of this successful firm, which has found it valuable not only to know how to do good lead work but actually to use much lead in its installations. Journeymen plumbers as well find that if they are thoroughly competent lead workers they are at a decided advantage.

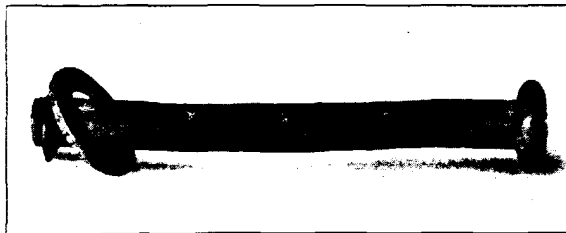
Lead Pipes 260 Years Old Feed Lead Fountains of Versailles



COURTESY ARCHIVES PHOTO.

Fountain of Latona, Versailles, whose lead figures were executed 250 years ago by Marsy.

AMONG the gardens of the world, those at Versailles with their multitude of magnificent fountains are perhaps the most famous. Practically all the groups of figures in these fountains and the vast network of piping which supplies the numerous jets with water are made of lead, now more than 250 years old. The pipes, which have been in continuous use since they were installed during the reign



COURTESY CENT. D'INF. DU PLOMB OUVRE

A section of lead pipe from the Versailles gardens, with the fleur-de-lys trade mark still visible after more than 250 years.

of Louis XIV, are still serving the fountains today, while the lead statuary is lovelier than ever.

The fountain figures were designed and executed in gilded lead by France's finest artists and craftsmen of the day for only in lead could such softness of line be attained. Most of these groups were executed between 1664 and 1670, and it was the magnificent basin of Apollo that inspired picturesque descriptive lines of poetry by La Fontaine.

During the summer months, these gardens are the scene of many fêtes, and are beautiful with the sun making rainbows through the spray of waters by day and illuminated by colored search-lights at night.

But the beauty of the fountains depends as much on the hidden network of lead pipes that supply the water as on the leaden figures in the fountains. These same pipes, which first supplied water to the fountains in 1664 for the pleasure of Louis XIV and his court, today supply it as faithfully as ever for the benefit of people who come to see them from all corners of the earth. Formerly, water was raised



COURTESY ARCHIVES PHOTO.

Fountain of Apollo, Versailles, designed by Le Brun and reproduced in lead by Tubi in 1670.

from the Seine to a lead-lined storage tower, whence it was brought through a lead-lined aqueduct to Versailles and distributed to the various fountains through lead pipes. The tower and aqueduct have given way to more modern equipment with steam and then electric pumps, but the network of lead pipes carries on. They seem to be none the worse for 270 years wear, and the fleur-de-lys markings on the surface of the pipes is as clear as ever.



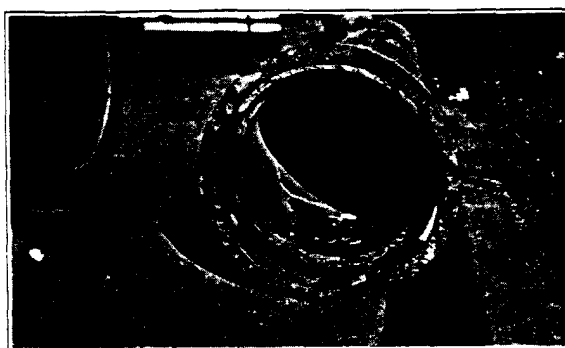
COURTESY CENT. D'INF. DU PLOMB OUVRE

Lead pipe, 30 cm. in diameter, with soldered joints, still supplying the Fountain of Apollo after more than two and a half centuries.

Lead Joints a Protection Against Main Failures

THE following incident of the failure of a cast iron pipe line, apparently due to the jointing material, has been reported from one of the largest cities in the country. A line of 16 in. cast iron pipe was installed in 1930, part of the 1,000 joints being made with lead and part with another material. In August, 1932, about 50 breaks occurred at joints and between that time and October, 1933, another 150 similar breaks occurred, all where lead substitutes were used. Fifty joints in the line which were calked with lead were found to be absolutely faultless. The replacement line has naturally been jointed entirely with lead.

The photograph shows the type of failure typical of this installation. Apparently, deflection of the pipe caused by ground subsidence placed undue strain on the bell of the pipe because the jointing material was too rigid to allow of ready adjustment. Undoubtedly the reason no trouble occurred at the lead joints was that lead is pliable enough to allow

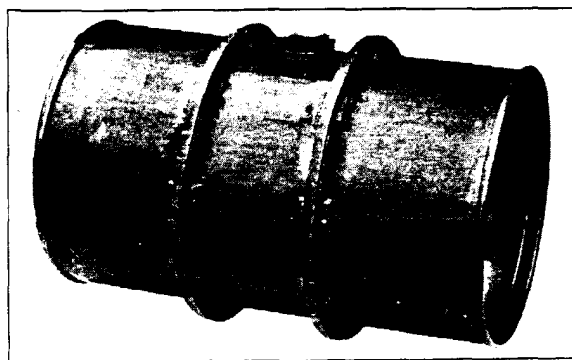


Failure of cast iron pipe probably due to too rigid jointing material being used instead of flexible lead.

of settlement without strain on the pipe and at the same time the lead itself does not crack but maintains a tight joint. Thus lead not only is the best assurance of tight joints but actually protects the cast iron pipe. This is even a more important item than having to repair joints. Such a condition readily demonstrates why it is wise to look beyond the first cost of making joints, because of the tremendous expense of re-laying an entire pipe line. This occurrence corroborates conclusions drawn from a similar happening described in LEAD, November, 1932.

Lead-Lined Steel Drum for Transporting Corrosives

A STEEL drum with a bonded lead lining, known as I.C.C. 5 H drum, has recently been approved by the Bureau of Explosives for transporting corrosive chemicals. This type of drum was recommended by the Manufacturing Chemists Association and, of course, passed rigid tests before adoption by the Bureau. It has a homogeneous coating with a minimum thickness of 3/32 in. It will be used for such materials as sulphuric, phosphoric and hydrofluoric acids, being satisfactory for sulphuric acid up to 1.85 sp. gr. and 66° Be., as well as numerous



COURTESY REPUBLIC LEAD EQUIPMENT CO.

I. C. C. 5 H lead-lined steel drum for transportation of corrosive chemicals.

other corrosives whose attack is resisted by lead.

This type of drum has a number of advantages in transporting chemicals not possessed by other containers commonly used. Primarily, breakage is eliminated. This saves much loss of both containers and chemicals. It likewise should effect a large saving to carriers, for breakage in mixed cars often means damage to other goods in the same car. This sturdy container should have a long life so far as mechanical wear is concerned. It means less handling expense because not so much care need be exercised and it means greater safety because the danger of cuts from broken containers is removed.

Less storage space is required for these containers because there are no crates around them and because there are no necks requiring space and pyramiding in stacking. These strong containers may be drained under pressure, lessening the time and trouble involved in draining. They should prove a real economy.

The I.C.C. 5 H lead-coated drum described in this article was developed by the Republic Lead Equipment Company and the Republic Steel Package Company, of Cleveland, Ohio, and has been manufactured by them for a number of years.

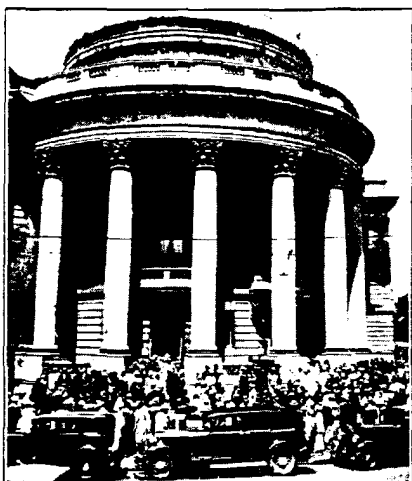
White Lead Paint Essential to Fine Decoration

WHITE lead plays a most important part in fine decoration. The firm of Mack, Jenney and Tyler, New York decorators, has decorated many outstanding buildings, public and private, both in this country and abroad, and almost invariably, except for certain special conditions, white lead and oil is the material used. This firm rarely does any commercial wall painting, but as a rule its decorating work consists of ornamental treatment or otherwise elaborate wall and ceiling design, usually in a multitude of colors.

The general practice followed by Mack, Jenney and Tyler is to use a white lead priming coat and three white lead body coats. The last body coat is tinted to



Great Hall, Palmer House, Chicago. The beautiful ceiling is a white lead job by Mack, Jenney and Tyler, of New York.



Entrance to Woolsey Hall, Yale University. The attractive interior decoration was done with white lead.

the ground color for the decoration and the final decoration in color goes on over this. Such a job is expected to last the life of the building except for those parts where hands and bodies may touch, which may eventually need refurbishing.

A small scale colored drawing of the decorating scheme is first made, and, from this, full size details are made which are transferred to the walls and ceilings.

Where murals are done on canvas in the studio, the canvas is fastened to the wall by means of a thick paste of white lead and varnish between the canvas and the wall which has first been painted.

So great is the adhesion of this mixture that, if the canvas is ever removed, much of the plaster generally comes with it.

To give some idea of the type of work done by Mack, Jenney and Tyler with pure white lead paint, the public spaces in the famous Palmer House at Chicago are good examples. Their work has also included the decoration of all court rooms and public spaces of the Essex County Court House in Newark, N. J., public rooms in the beautiful new city hall at Buffalo, N. Y., the main auditorium of Woolsey Hall at Yale University and the public rooms and auditorium in the Worcester (Mass.) War Memorial. These of course are only a few of the outstanding decorating jobs on which Mack, Jenney and Tyler have relied upon white lead for fine artistic results and durability.

OMISSION

In the article appearing in the November, 1933, issue of Lead, dealing with the new plumbing code in Pleasantville, N. J., we failed to mention our usual recommendation regarding lead shower pans. They should always be coated on both sides with asphaltum to preclude any possibility of corrosion by free lime in cement, concrete or mortar with which they may come in contact in the presence of air and moisture, or of corrosion from cinder fills over which they may be set. After the cement, concrete or mortar has become thoroughly carbonated, there is no longer danger of this type of corrosion.

THE LEAD INDUSTRIES ASSOCIATION INVITES INQUIRIES ON ANY SUBJECT RELATING TO LEAD AND WILL BE GLAD TO COOPERATE WITHOUT OBLIGATION IN THE SOLUTION OF YOUR LEAD PROBLEMS