

A STORY OF FERTILIZER AND THE COLOUR PURPLE

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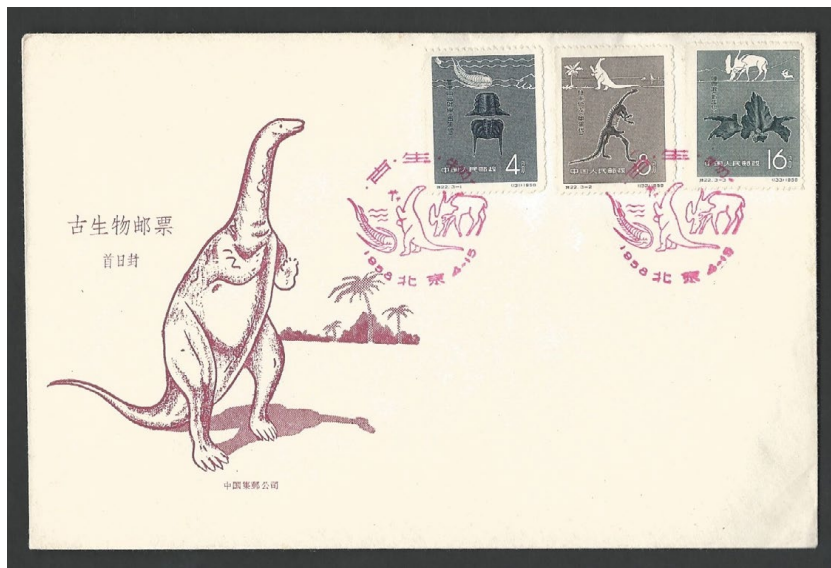


FIGURE 1.1 China 1958 Prehistoric fossils, set of stamps on First Day Cover.

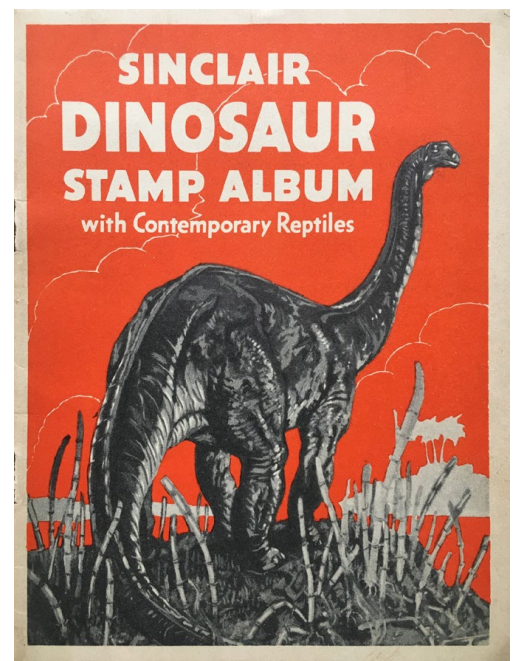
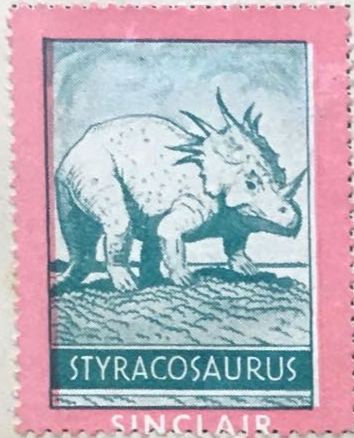


FIGURE 1.2 Dinosaur stamps (Cinderellas) produced by Sinclair Oil in 1935.

1. INTRODUCTION

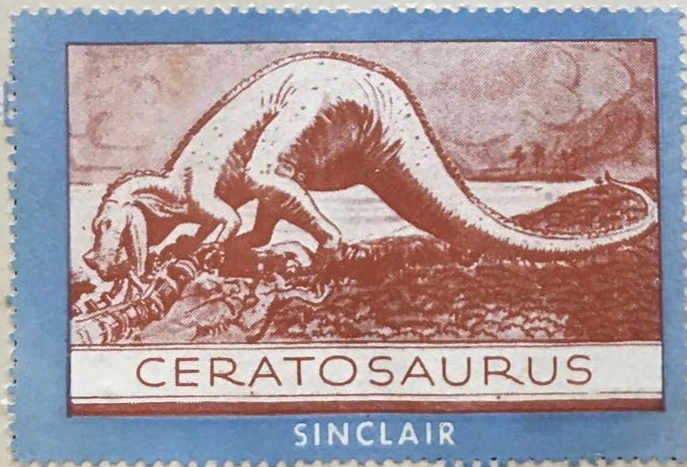
It is sometimes difficult to admit that you are (officially) a nerd, but I have a confession to make: I have collected dinosaurs on stamps for the last thirty years. Over 10,000 of these stamps have been issued across the world, and the vast majority of these issues are in my collection. One question that I am often asked is when the first dinosaur stamp was issued, which turns out to be the Chinese 1958 “Chinese Fossils” set of three stamps, one of which features *Lufengaosaurus*. This dinosaur was originally discovered in 1930 in Upper Triassic sediments of the Yunnan Province in southwest China. The delightful first day cover shows a shy prosauropod resting on its tail (Figure 1.1).

Things become more complicated when you broaden the definition to include any postal items like cinderellas (i.e., virtually anything resembling a postage stamp, but not issued for postal purposes by a government postal administration) and more. The Sinclair Oil Corporation’s official brand mascot is Dino, a large green sauropod. This image has featured on many giveaways, including stamps that could be stuck in albums. The first set of Sinclair dinosaur stamps was published back in 1935 (Figure 1.2), with four million albums distributed to the public, testifying to successful petroleum marketing. Another early dinosaur stamp, painted by John Heber Stansfield, was issued by the Utah Tourist Board around 1932. It showed a large dinosaur skeleton and publicized the state’s Dinosaur Monument (Figure 1.3).



STYRACOSAURUS
(crowned lizard)

Length about 17 feet, height about 6 feet. STYRACOSAURUS was one of the horned Dinosaurs having a prominent horn on the nose, short horns above the eyes, and a crown of sharp spikes on the head frill.



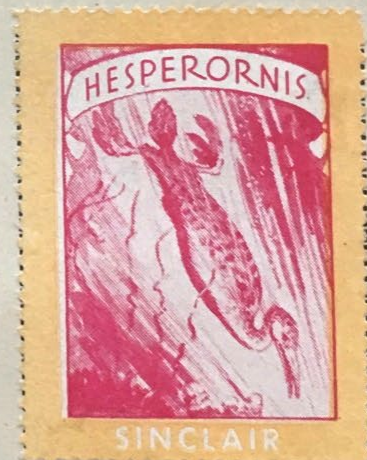
CERATOSAURUS
(nose horned lizard)

Length 20 feet, height 10 feet. CERATOSAURUS was a medium-sized flesh-eating Dinosaur with a prominent horn on the nose and small bony skin plates along the back. It had small front feet, and powerful short hind feet.



PALAEOSCINCUS
(ancient skink)

Length 18 feet, height 5 feet. PALAEOSCINCUS was an armored plant-eating Dinosaur that resembled an overgrown western lizard, called the horned toad. His body was low and broad, with sharp spines along the sides and a pointed tail.



HESPERORNIS
(western bird)

HESPERORNIS was an early Cretaceous swimming bird, having teeth like ARCHAEOPTERYX, but with a short tail, no wings and with powerful lobed feet. It resembled a large loon, but could not stand upright.

FIGURE 1.3

Advertising stamp produced for tourism: Dinosaurs in Utah, painted by John Heber Stansfield around 1934.



FIGURE 2.1 Postal stationery sent by Torrance Lime and Fertilizer Company in 1922.

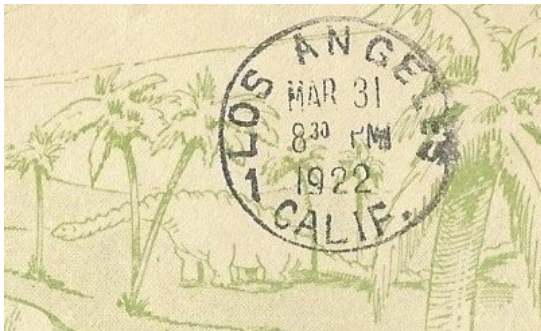


FIGURE 2.2 Detail of dinosaur on cover.



FIGURE 2.3 Original artwork painted by Robert Bruce Horsfall for *A History of Land Mammals in the Western Hemisphere*, published in 1913, and shamelessly copied for the Torrance Lime and Fertilizer Company envelope and publicity material.

2. (PERHAPS) THE OLDEST PHILATELIC DINOSAUR

These cinderellas are nearing their centenary, but I have one postally used envelope in my collection that outdoes them all. Knowing of my interest in dinosaur philately, years ago an American stamp dealer gave me a unique prepaid cover (Figure 2.1), originally sent to the Department of Agriculture by the Torrance Lime and Fertilizer Company, of Lomita, California, in 1922. The envelope has an embossed stamp, in addition to a printed sketch showing a wide variety of ancient animals, including a somewhat dubious dinosaur sketch (Figure 2.2). The cover raised so many questions for me. What was this company? Why were there ancient animals (and a caveman) pictured on the cover? What was originally in the envelope? Was the company still in business? The more I researched these questions, the more data I uncovered, spanning social history, geology and palaeontology.

Examining the envelope (Figure 2.1), the most striking detail is the large sketch in green ink. It shows a saber tooth tiger (*Smilodon californicus*) roaring as it stands over a Columbian mammoth carcass (*Mammuthus*

columbi) in a tar pit. Several dire wolves (*Canis dirus*) are squaring up the big cat, while a solid-looking caveman stands to the right. A small, wobbly sauropod dinosaur (Figure 2.2) stands in the shade of the palm trees in the background. Also of note is the marine shell on the company logo (upper left) and further shells in the foreground. The basis for the main sketch was an original drawing (Figure 2.3) by Robert Bruce Horsfall for the book *"A History of Land Mammals in the Western Hemisphere"*, written by Robert Berryman Scott,^[1] dating back to 1913. The Neanderthal figure is from a 1920 Chicago Field Museum diorama. The dinosaur on the cover appears to have been added at the last minute by someone who was NOT an artist!

The envelope itself is a piece of "postal stationery," i.e., it has a stamp printed directly onto the envelope to pay the postage. The envelopes were sent to the post office, where the stamps were struck on paper, referred to as "stamped to order" or STO. Paper had to be submitted flat and unfolded, and stamping was done with the same embossing presses

as used for post office envelopes. In 1922, the date of the postmark on the envelope, the domestic postage letter rate was 2 cents/oz. The embossed image, carmine in colour, shows George Washington.

The envelope is postmarked March 31, 1922, which was a Friday. On that day, KFI-AM in Los Angeles, CA, began radio transmissions and Prince Hendrik opened a trade fair building in Amsterdam. The actor Patrick McGee (*A Clockwork Orange*; *Barry Lyndon*) was born in Armagh, Northern Ireland. Temperatures in Los Angeles reached 61° F, with a low of 50° F and no precipitation.^[2] Across the world that year, Russia was enduring a terrible famine, Mussolini's Fascist Party seized control of the Italian government, Stalin was appointed General Secretary of the Communist Party, Egypt gained independence from Britain, the first successful insulin treatment of diabetes was made, and the silent film *Nosferatu* premiered in Berlin. The US President made his first speech on the radio, the BBC was created, and the Hollywood and Rose Bowls opened.



FIGURE 3.1 Map showing quarry locations mentioned in article, located north of Los Angeles.

“Free Fish Friday” For Red-Headed Girls Causes Rush

Lou W. Johnson, whose middle initial stands for Wilmington, where he is secretary of the chamber of commerce, said today that he never knew there were so many red-headed girls in existence until he came to Torrance to attend the fair and preside over the Wilmington Chamber of Commerce booth.

The reason for this viewpoint of the live-wire secretary is the fact that in an unguarded moment and without getting vital statistics on the auburn-haired population of Torrance he offered “Free Fish Friday” to all red-headed girls who would call at the exhibit of the Coast Fishing company. We saw him late yesterday afternoon and he looked and acted as though he had “gone over the top.” Owing to his exhausted condition we were unable to get exact figures as to just how many cans of tuna he had given away, but we thought we heard him mutter “Never again” and that when he reached the booth Friday morning there were nine—or was it ninety?—red-haired beauties waiting for their free can of fish.

FIGURE 3.2 Newspaper story “5000 Barrel Well Struck” in Torrance Enterprise, December 1921.

3. TORRANCE, CALIFORNIA

Torrance was founded on May 31, 1911, by Jared Sidney Torrance through the purchase of 2791 acres of land from the Dominguez Estate Company for \$976,850. Other names were considered (including Southport, Coronel and Industrial) but the board approved the resolution calling for Torrance, over the objections of Jared. The city was incorporated on May 21, 1921.^[8] It is a coastal city in the Los Angeles metropolitan area in California (Figure 3.1).

By far the most fertile source of information about everything Torrance, including the Fertilizer Company, can be found in the newspaper archives of the time.^[9] The Torrance Herald was the city's newspaper of record from 1914 to 1969. The Herald started as an advertising sheet singing the praises of the new “modern industrial city” and evolved into the premier newspaper of the rapidly developing city. The Torrance Enterprise also

began as an advertising sheet that grew into a newssheet.

Throughout the 1920s, both papers chart the rapid growth of the city, while sharing some wonderfully parochial tales: who was taking tea with whom, who had been bitten by a dog and much more. Newspaper headlines in 1921 included “Lamp posts painted”, “Truck stuck in the mud”, “White Gopher Caught” and, in 1922, “Huge melon on display” and “Free Fish Friday For Red Haired Girls Causes Rush”. Much of the information in this article that relates to the Torrance Lime and Fertilizer Company is drawn from these newspaper archives.

Scouring the pages in early 1921, adverts promoting Torrance as a growing city, sponsored by the Dominguez Corporation, took pride of place in every issue. There were also stories every Friday (the day that both newspapers were published) relating to the Torrance Lime and Fertilizer Company (see

section 6). In a newly founded community, somewhat short of real news, it is likely that sponsorship by the company enabled them to place abundant stories about the efficacy of their fertilizer but, as we shall see later, the company went way beyond this.

The fame of the Fertilizer Company was short lived. On February 26th, 1921, the Chanslor-Canfield Midway Oil Company (CMO) spudded a well in Torrance. The Torrance Herald reported a major strike at the Santa Fe Well No. 1, two miles from town on Aug. 18, 1921, and another gusher at the well occurred on Dec. 7, 1921 (Figure 3.2). The find came to be known as the Del Amo Field, with the well initially coming in at a rate of 2,500 barrels a day. Soon, a belt of wooden oil derricks carpeted the southern half of the city, stretching from the Southwood area to present-day Harbor City and Wilmington. The oil rush gradually “out-newsed” the stories of fertilizer mining.

NEW TWIST TO AN OLD STORY.

*Boys Hunt Gold; Find Riches
in Another Form.*

*Limestone Discovery Believed
an Important One.*

*Company is Formed to Place
Product on Market.*

While roaming through the San Pedro hills, between Redondo Beach and San Pedro, hunting for pirate gold, W. W. and V. E. Johnston, two Lomita boys, came upon a deposit of limestone which, after months of investigation, it became known yesterday, gives promise of being one of the most lucrative of recent strikes in Southern California. The limestone, of which there is said to be an almost inexhaustible supply has been analyzed by expert chemists and tested in various industries, including the Llewellyn Iron Works, and has been declared to be of an exceptionally high grade.

The find was made on the Weston ranch, which adjoins the Palo Verde hills, the property of Frank A. Vanderlip, New York banker. Legend has it that many years ago, when Redondo was the only port of entry for Southern California and civilization had not yet been firmly implanted upon these shores, pirates had hidden their loot upon these hills. Many, in by-gone days, paid real coin for charts of the hills giving the supposed location of the treasure, and many excavations to find it have been made. It was in one of these excavations in which the Johnston boys were exploring that the limestone was discovered.

EXTENT OF DEPOSIT.

A survey of the land shows that the limestone deposit covers about thirty-seven acres. The Torrance Lime and Fertilizer Company has been formed to exploit this deposit, with capital said to be sufficient for all purposes. Seven acres have already been purchased and a long-term lease has been secured on the remaining acres. Pulverizers and crushers have been ordered, as well as two revolving kilns, for the burning of the limestone. Tube mills will be erected in the near future, it is stated.

A road is now being cut through the hills so that the product can be brought into Torrance by trucks, which is only a few miles distant.

The directors of the company are George W. Towne, president; W. W. Johnston, vice-president; Frank Sammons, secretary and treasurer, and G. W. Nell and Verne E. Johnston.

Former surveys made by geologists indicate that the limestone deposits in this State are generally found to be from 100 to 150 feet in depth, a pulverized form appearing on the top and the main ledge cropping out about half way down. From several of the holes dug in the hills seventy-five feet in depth it is believed that the limestone deposit in these hills is many times that depth.

The limestone here appears to be of a marine formation, consisting of corals, shells, skeletons of carbonate of lime, calcareous sand forming a limy silt, vegetable matter, and microscopic animal life, which the percolating action of the sea water hardened into a dense, fine-grained limestone.

WHAT ANALYSIS SHOWS.

An analysis shows that it contains 95 per cent. of calcium carbonate, 1.25 per cent. of magnesia, 2.72 per cent. of phosphate and only .03 per cent. of iron. The low percentage in iron makes it especially valuable for use in the manufacture of glass, while the low percentage in magnesia makes it valuable for use by sugar refineries.

Los Angeles Times, May 1919

FIGURE 4.1 Story of the discovery of the Torrance Lime and Fertilizer deposit, Los Angeles Times, May 1919.

4. THE TORRANCE LIME AND FERTILIZER COMPANY

Two Lomita boys, hunting for pirate gold, came upon a deposit of limestone (Figure 4.1), which, after months of investigation, gave promise of being one of the most lucrative strikes in Southern California. The find was made on the Weston Ranch, which adjoined the Palos Verdes hills (Figure 4.2), the property of Frank Vanderlip, the founder of Citibank and co-creator of the Federal Reserve.^[4]

The Torrance Lime and Fertilizer Company was formed in 1919 to exploit this deposit. Pulverizers and crushers were ordered, as well as two revolving kilns. A road was cut through the hills so that the product could be brought into Torrance by trucks. The directors of the company were George Towne, President, W. Johnston, vice-president, with Frank Sammons as secretary and treasurer. A decision was made in November 1921 to develop the

company as rapidly as possible. They also decided to change the name from the TL&FC to the Decomposed Marine Shell and Bone Company, DMS&B, with these initials as trademark.

The company later opened a second quarry in Lomita, as described in an old Californian mining journal:

Lomita (southwest of), Los Angeles County, California – Palos Verdes Limestone Deposit (Algal Limestone)..... limestone was produced for 3 years 1927-29 inclusive, by Torrance Lime and Fertilizer Company. It was used primarily by Pioneer Compost Company and also by citrus fruit growers on adobe soils.....These fossil beds are reported to be 30 feet thick and are covered by 12 feet of adobe soils. They are probably Quaternary (Pliocene).

The quarry mined fossiliferous Pleistocene marl and limestone, dipping to the northwest. Nodules of phosphorite were present in the marl, making the deposit suitable as a fertilizer. The open pit was 300 feet long, 200 feet wide and 60 feet high (Figure 4.3) and mined with a dragline scraper, with the production crushed in a 100-ton plant on the property. The location of the quarry was listed as being on the East Slope of Palos Verdes Hills (Sec. 34, T. 4 S, R. 14 W), about 1 mile southwest of Lomita.^[6] The Lomita Quarry (Figure 4.4) yielded many fossils, mostly invertebrates, but was outshone by the original Torrance Lime and Fertilizer Company. Its numerous fossils were alleged to make it the world's best fertilizer (see section 6).

FIGURE 4.2 Aerial photograph above Redondo Beach, Palos Verdes Hills in the distance, 1935 (Palos Verdes Library).



Another 1935 aerial photograph is a view above Redondo Beach to Point Vicente on the Palos Verdes Peninsula. While Redondo Beach shows many beach cottages and homes, the Torrance area shown on the left is all farmland. (Courtesy Palos Verdes Library Local History Collection.)



Fossil Beds, San Pedro Hills, Torrance Lime and Fertilizer Company.

FIGURE 4.3 Photograph of the fossil beds at Lomita Quarry, 1927.

5. THE COLOUR PURPLE

By 1921, the makeup of the board had evolved, with Frank Sammons promoted to President, Richard. C. Kite as secretary and Samuel Maus Purple (Figure 5.1) hired as General Manager in March 1921. Purple was born in 1878 in Pennsylvania. His profession was listed as an archaeologist, but census records^[10] indicate that he was always a salesman, so maybe he embellished the truth a little. He even wrote an extended article on sales techniques in the *Torrance Enterprise* in June 1921. He focused on patient, persistent effort, putting the customer at ease, acquiring an education and energy.

As we will see, he was also an obsessive amateur palaeontologist (Figure 5.1), a penchant that

came to the fore in his job at The Torrance Lime and Fertilizer Company. Later in his career he kept up an interest in geology, discovering a large, steaming, volcanic crater (Figure 5.2) near Santa Paula, CA, in 1930.^[11,12] He and his wife had two daughters and eventually retired to Monterey, where he died in 1965.^[10] His wife donated his scientific papers to the National Library of Medicine (U.S.) in 1967 and his fossil collection to the Municipal Museum of Riverside, California, in 1968.

S. Maus Purple brought every ounce of his expertise to bear when it came to getting the most out of the mine. He immediately recognized that the fossil component of the excavated material could be used to advertise

the product and invited many scientific experts to visit the mine to share their expertise. Based on their input, Purple wrote and disseminated numerous stories in the press (faithfully reported in the *Torrance Herald* and *Torrance Enterprise* newspapers) as well as handing out editions of the “Life Extension Bulletin”, a privately financed newssheet, to visitors to the mine. These included advertisements, testimonials, letters from scientists, geochemical reports and geological stories aplenty. They certainly make for entertaining reading, more than one hundred years later, and at the time the company must have been one of the largest in Torrance, the burgeoning city.



General Manager S. Maus Purple inspecting prehistoric teeth, tusks, bones and shells 500 thousand years old. Holding cannon bone of five-toed prehistoirc horse.

FIGURE 5.1 Purple with a variety of fossils from the Torrance Lime and Fertilizer quarry, 1921, *Torrance Herald*.

FIGURE 5.2 Purple in the field near Santa Paula, CA, in 1930.



6. ADVERTISING - A PURPLE PATCH

The two “Life Extension Bulletins” presented to quarry visitors by Purple, together with adverts sprinkled through local newspapers (Figure 6.1), did not hold back when singing the praises of their fertilizer:

D.M.S. Lime will singly and alone render land more productive than any other substance used as a fertilizer

...unless more lime is put into the soil, strong-limbed athletes cannot be developed in this country...

Our Heavenly Father in His supreme wisdom has placed this vast deposit of ancient marine shell lime at the very gates of the centre of one the

greatest agricultural districts of the universe..... Use D.M.S. Lime and stimulate your faith!

“I used about three tons of D.M.S. to less than one half acre of ground, which was very hard adobe. The D.M.S. absolutely turned the adobe into an aerated broken up soil, on which I grew the largest and best crop of melons” (J.E. Chandler)

It makes the crops grow and the ranchers crow.

The papers also published many testimonials from satisfied customers (Figure 6.2), along with details on the analysis of the bedrock. Reading through some of this material, mostly drawn from the *Torrance Enterprise* newspaper, seems

like overkill, but other fertilizer companies were up to the same tricks (Figure 6.3). Purple also pushed stories about the fossils (as we shall see below), and some of the finds at the company quarries made their own headlines: “Monster Shark Tooth is Found – Largest Specimen Unearthed in History” (Figure 6.4).

One unusual decision made by the Company was the rebranding of the Torrance Lime and Fertilizer Company to the Decomposed Marine Shell and Bone (DMS & B). It hardly seems a very catchy title but is proudly displayed on every advert (Figure 6.1) and even on the original envelope (Figure 2.1).

7. PURPLE AND THE ACADEMICS

In May 1921, Purple invited over one hundred distinguished visitors to visit the DMS&B lime deposits of the TL&FC south of Lomita (Figure 7.1). After examining the different formations that had been exposed, luncheon was taken, and several “shots” put off that were real blasts. Many interesting discoveries were made after the blasting, including jaw bones, thigh bones and wish bones. Most exciting was the tooth of a sabre tooth cat, fully 5.5 inches in length. There were three shots made, the third one being quite disastrous, throwing a large boulder over onto the office building and puncturing the roof. No one was hit, however. As mentioned earlier, Purple also distributed a unique and well-edited newspaper entitled “Life Extension Bulletin”.

Purple clearly spent significant amounts of time looking for fossils. He put many on show at the quarry and in the window of Lee’s Grocery Store, advertised under the title “Fertilizing with Fossils” and published a map to help visitors find their way to them (Figure 7.1). Exhibits included “teeth, vertebrae, feet and

toes”. Maus sent specimens to several experts in the southwestern US, one of whom was Professor David Starr Jordan. He wrote back, describing the fossils as “a most extraordinary mixture of land and sea stuff”. “The mammal bones seem to be fragments of whales and... sea lions, perhaps”. He was particularly excited by the shark teeth: “The two large shark’s teeth are especially valuable because they are different from any that we have ever received and the species, one of the great white sharks, seems to be new to science. The fish must have been nearly 100 feet long”. He eventually identified at least four species of Carcharodon, the great white shark, and several other shark species. He eventually named one of the new species of Carcharodon after Purple.

David Starr Jordan was a New York native who received both medical and doctorate degrees in Indianapolis, helped to name more than 2,500 species of fish and served as the founding president of Stanford University. His support of eugenics led to the removal of his name from several buildings.

Ernest Locke (geologist) wrote to Purple to say “I am of the opinion, judging from a short visit to your property, that your deposit was formed near the mouth of a river emptying into the ocean, in the shallow brackish waters of which lived and died the organisms whose shells in incredible numbers accumulated for centuries and centuries.....the deposit apparently belongs to the Tertiary period, judging from the fauna remains and especially from the immense shark’s teeth discovered there”.

Other visitors included Dr. Milbank Johnson, president of the Southwest Museum, and a staff of scientists. Purple had agreed for the museum to take over all the fossil remains, while the museum would be ready to rush trained excavators to the scene whenever particularly promising remains were brought to light. Professor Chester Stark, an eminent geologist, and Dr Wyman of the Museum of History, Science and Art, also visited, the latter marvelling at a 4.5 inch long shark tooth: “far and away the largest shark’s tooth recorded”.

Bradley's Super-Phosphate.

THE
BRADLEY FERTILIZER CO.
ARE THE
Largest Manufacturers
OF
ARTIFICIAL FERTILIZERS
IN
THE UNITED STATES,
AND SECOND IN
THE WORLD.

THE STATE OF GEORGIA
Uses over 80,000 tons of Superphosphate annually; one Planter using 500 TONS of BRADLEY'S Phosphate in a single year.

GREAT BRITAIN
Consumes over 400,000 tons of artificial Fertilizers annually.

Since the commencement of the present Century,
THE SOIL OF GREAT BRITAIN
Has increased its Productiveness
SIXTY PER CENT.

CENTENNIAL MEDAL
THE HIGHEST AWARD

At the Centennial Exhibition one gave to the BRADLEY FERTILIZER CO. in the following exhibition of Artificial Fertilizers of superior quality. The award is the Great Working of the Award by the Centennial Judges.

FARMERS, BUY THE BEST.

More than 50,000 Tons
Of Animal Bones and Dried Flesh
are used annually by the Bradley
Fertilizer Company in Manufacturing
their Celebrated Phosphates.

**BRADLEY
FERTILIZER
COMPANY**
MANUFACTURERS OF
Bradley's Standard Fertilizers.

**BD
SEA FOWL
GUANO.**

Manufacturers of
Pure Ground Bone,
Bone Meal for Cattle,
Bones and Potash Manure.

Importers of Guano, which are offered at the
lowest prices.

Nitrate of Soda,
Sulphate of Ammonia,
Dissolved Bone Black,
Murrate of Potash,
Sulphate of Potash,
Potash Salts, &c., &c.

**BRADLEY'S
SUPER-PHOSPHATE
OF LIME**
THE
STANDARD FERTILIZER.

MANUFACTURED BY
Bradley Fertilizer Company,
No. 27 KILBY STREET,
BOSTON, MASS.

MASTODON GIGANTEUS

THE MOST PERFECT, AND AT THE SAME TIME THE MOST WONDERFUL OF THE LAND ANIMALS, IS THE MASTODON. ITS DIMENSIONS WERE TRULY GIGANTIC, SOMETIMES MEASURING TWELVE FEET IN HEIGHT BY TWENTY-FIVE IN LENGTH. ITS WEIGHT COULD SCARCELY HAVE FALLEN BELOW 20 TONS.

Highest Cash Price Paid for
BONES
By the
Bradley Fertilizer Company,
27 KILBY STREET, BOSTON.

FIGURE 6.3 Competing advertisement for Bradley’s Super Phosphate fertilizer, cloth advertisement from Boston, 1881.

MONSTER SHARK TOOTH IS FOUND.

*Largest Specimen Unearthed
in History of Science.*

*Fish That Lost It Estimated at
Sixty Feet Long.*

*Modern Man-Eater Would
Look Like Minnow.*

A shark’s tooth more than twice as large as any heretofore known to scientists was unearthed last week from the lime pits of the Torrance Lime and Fertilizer Company, near Torrance, where excavations which have held the attention of geologists for several weeks are still in progress.

The gnasher is five and three-fourths inches long, three inches thick at its heaviest end and is fully four inches wide at its base. Dr. L. E. Wyman of the Museum of History, Science and Art, after a careful examination of the tooth, declared that he felt that he was speaking conservatively when he said that it is far and away the largest shark’s tooth recorded and might even go as high as two and a half times as large as any with which he is acquainted.

The immensity and the fighting efficiency of the shark which carried such an aid to digestion can only be fully grasped when it is remembered that a shark has 200 teeth, arranged in four rows on each side of the jaw and gradually tapering to tiny, dagger-like teeth. A shark which has a tooth an inch and a half long is considered a monster, and one with a tooth two inches long can generally be counted upon to be fully twenty-five feet long.

FIGURE 6.4 News story about the Great White shark teeth found at the Torrance Lime and Fertilizer quarry, Los Angeles Times 1921.

AN INVITATION

301 Bradbury Bldg.,
Los Angeles, Cal.
October 22, 1921.

Mr. P. C. Roberts,
Lomita, Cal.

Dear Mr. Roberts—The presence of yourself and friends is very much desired at a gathering of Scientists, Geologists and Engineers, to be held at the D. M. S. & B. Lime Quarry, Saturday morning, October 29th.

Dr. David Starr Jordan of Leland Stanford University has classified some fifty prehistoric fossil specimens. These will be on exhibit with hundreds of others, together with Dr. Jordan's letters. The fact of this deposit is thoroughly opened up, giving one an excellent opportunity for close inspection of this wonderful formation.

Wear fatigue attire and come prepared for an injection of "D. M. S. Pep." That will make you think you have partaken of the Fountain of Youth. If you are interested in history, science, art, all growth, all progress, all triumph over difficulties, yea, in agricultural prosperity itself, you cannot afford to deny us the pleasure of your presence.

The general assembling point will be at Exposition Boulevard, opposite the State Building, Exposition Park, at 10:30 a. m. sharp. Transportation will be arranged for those who do not have their own autos.

Kindly advise me at the Los Angeles office the names of those in your party; also if you have extra seating capacity in your own auto.

Most cordially,
S. MAUS PURPLE.

P. S.—Sandwiches and coffee will be served.

ATTENTION!

SCIENTISTS
GEOLOGISTS
HISTORIANS
LANDSCAPE ARTISTS
AGRONOMISTS
BIOLOGISTS
AGRICULTURISTS
RANCHERS
FARM ADVISORS
POULTRYMEN
IN FACT
In Fact
CITIZENS IN EVERY
WALK OF LIFE

**THE
TORRANCE LIME
and FERTILIZER
COMPANY**

Extend to You
A Hearty Invitation

To visit their Lime Quarry in the foothills of the Palos Verde Range, where the D. M. S. Prehistoric Fossils are daily being excavated, a permanent exhibit of which is on display week days.

This vast upheaval of Marine Life Lime, consisting of millions of tons, lies plainly before your vision, welcoming your inspection, and inviting your comparison.

When you realize that Time lends more to the economical foundation and progress of a nation than any single commodity, we should well appreciate our Heavenly Father's supreme wisdom in placing such a decomposed soluble lime deposit at the very door of a city destined to become the greatest of the universe.

**The
Home
of
the
Most
Talked
of
Fertilizer**

**PERMANENT FOSSIL EXHIBIT ON
DISPLAY AT QUARRY
WEEK DAYS**

D. M. S. ENTERTAIN

Over one hundred distinguished visitors representing all lines of business were invited to visit the D. M. S. & B. Lime deposits of the Torrance Lime and Fertilizer Co., south of Lomita in the O. S. Weston Hills on Saturday. After examining the different formations that had been exposed, luncheon was served the guests, after which several "shots" were put off that were real blasts. Many interesting discoveries were made after the blasting. There were three shots made, the third one being quite disastrous, throwing a large boulder over onto the office building and puncturing the roof. No one was hit, however. Many remained at the quarries until darkness settled over the pit, bringing to an end further investigation. A unique and well edited four-page newspaper was distributed by S. Maus Purple, general manager for the company. The title of the "sheet" is "Life Extension Bulletin," Vol. 1, No. 1.

Exhibits and displays of petrified bones, teeth, vertebrae, feet and toes, etc., are on display at the property. The "fountain of youth" is properly labeled, D. M. S. Home Brew. "Without lime there can be no life, either plant, animal or human." Wonderful results have been attained the past year by application of pulverized lime to soil, the results being record breakers.

A score of men, some of them known throughout the world for their scientific knowledge and discoveries, are pattering around the debris caused by an explosion near Lomita last Saturday.

The explosion was caused when 100 pounds of dynamite was touched off. Locally the effect was to disturb many tons of substance, but the blast turned up relics that will interest the scientific world.

Invitations to visit the quarry, 1921

FIGURE 7.1 Details of invitations to scientists and the public to visit the company quarry, published in the Life Extension Bulletin, a printed handout given to visitors.

8. GEOLOGY

The geology of the area was described by Professor Ellis Bailey, Professor of Geology at the University of Southern California in 1922 (Table 1). Those containing significant fossils in the Torrance Lime and Fertilizer Pit are highlighted in yellow. The company's lime deposit is on the edge of the fault line, which occurs at the base of the hills from Redondo to San Pedro and is about 250 feet above sea level. The origin of this vast deposit of decomposed marine shells is an accumulation

of shell fragments and foraminiferal cases on the ocean bottom.

Bailey's interpretation, published in the company's Life Extension Bulletin in 1922, fits closely with modern ideas (Fig 8.1; 8.2). An island ("Palos Verdes Island") was formed by uplift, perhaps 1 million years ago.^[16,17] The island was cored by the Altamira Shale. Continuing changes in relative sea level created at least 13 terraces at different

elevations (Figures 8.3; 8.4), on which mainly shallow marine deposits were laid down.^[17,18] The stratigraphy is often complex due to repeated downcutting and deposition as well as relative sea level changes (Figure 8.3). The Palos Verdes sand was deposited around the island and some distance beyond. Sedimentation was influenced by the ongoing subduction of the Pacific Plate, leading to significant tectonic deformation, and localized angular unconformities are common.

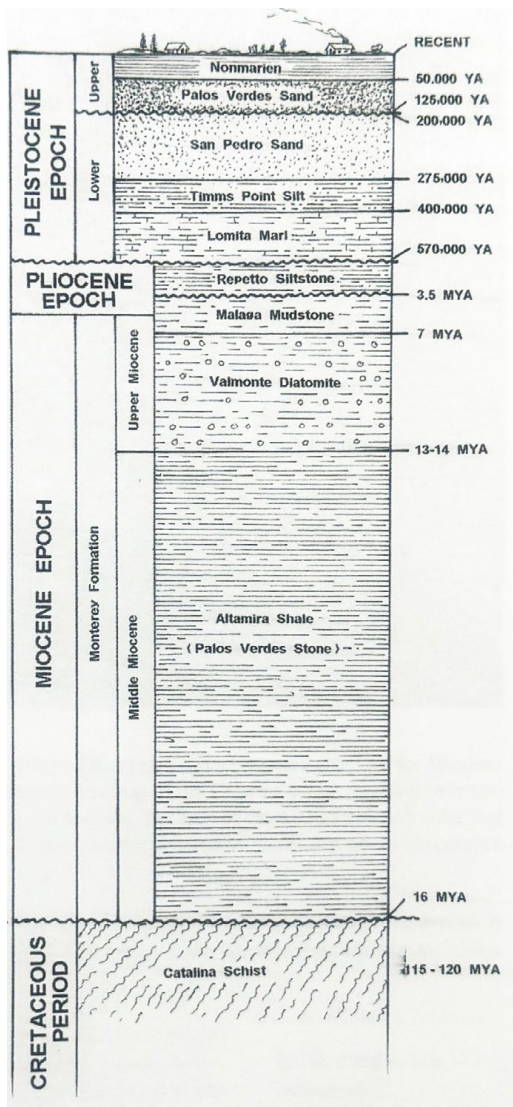


FIGURE 8.1 Stratigraphic column taken from Joe Cocke's excellent book *Fossils of the Palos Verdes Hills*, 2015.

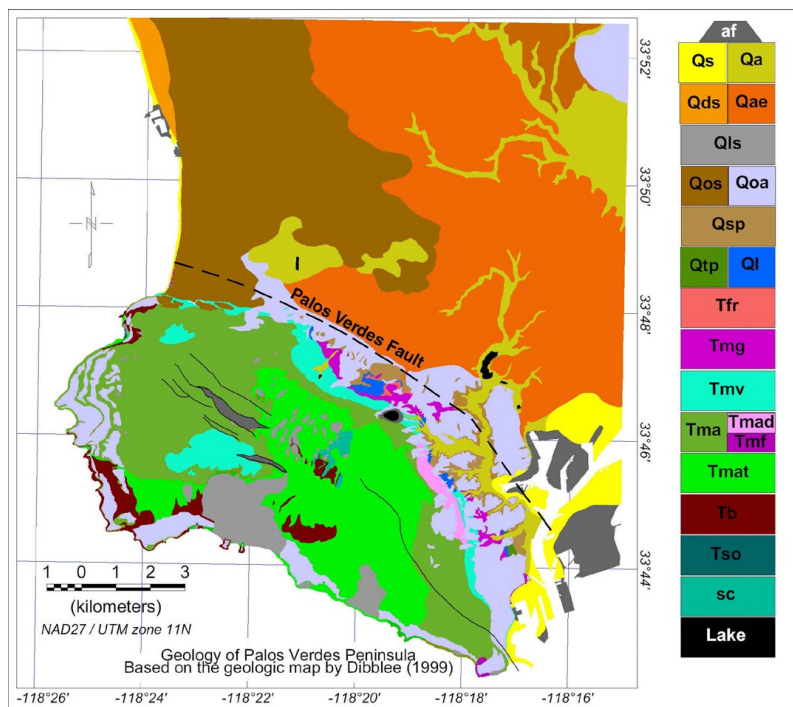


FIGURE 8.2 Geological map of Palos Verdes Peninsula, USGS, after a map by Dibblee 1999.

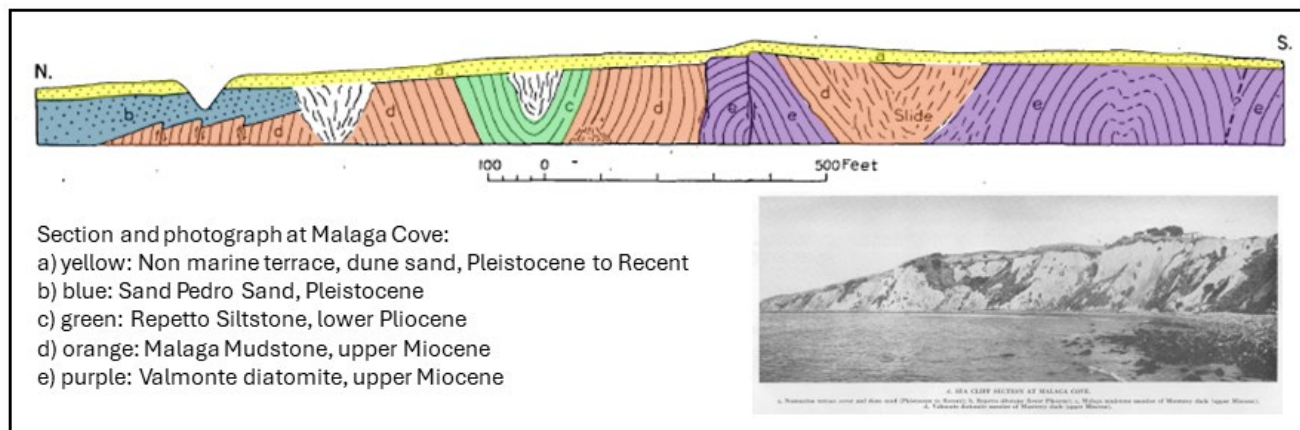


FIGURE 8.3 Cross-section of typical terrace morphology, from Woodring et al 1946.

Age	Formation	Depositional setting
Recent	Strand Fm.	Terrace Epoch – raised beaches dating from Inter-Glacial to after the San Pedro epoch. The terraces are wave-cut with marine gravels and are cut by later gullies eroded into them. Some contain middens including mounds of seashells and bones of land animals as well as charcoal and arrow heads. Unconformity at the base. (<i>Terrace Epoch is equivalent to the Palos Verdes Sand</i>)
Pleistocene	San Pedro Epoch	The Upper San Pedro was laid down in 50 fathoms of water with an abundant warm water marine fauna. Soft sandstone and marls, the ocean encroached upon the edge of the land. Valleys were filled with gravel, and the plains covered with sands and other sediments. The Lower San Pedro (<i>Deadman's Island Beds</i>) has a cold water fauna including bones of whales, sea lions, shark's teeth, sea shells. <i>Underlain by the Lomita Marl and Timms Point Silt (common molluscs). Terraces began forming around 1 million years ago, when the Palos Verdes area was an island.</i>
Pleistocene	Sierra Epoch	Uplift with the great height of the Sierras bringing glaciers. There were two glacial periods with an inter-glacial when mankind and the Rancho La Brea animals appeared. Limited fossils. (<i>Uplift may have happened up to 40 MYA</i>)
Pliocene	San Diego Fm.	Red and yellow sandstone, laid down in water about 100 fathoms deep (<i>equivalent to the deeper water Repetto Siltstone</i>).
Miocene	Monterey Fm. (<i>now called the Altamira Shale or Palos Verdes Stone</i>)	During the Miocene this low island sunk to a depth of 500 fathoms beneath the waves, and the sediments were deposited. These contain the petroleum of the Los Angeles oil fields. Just after the Monterey sediments were laid down the rocks were folded, faulted, forming the Coast Range. The Monterey rocks were intruded by a diabase found near the summit of the San Pedro Hills. (<i>Fossils similar to modern fauna but with much smaller whales; the most common fossils are herring, mainly scales. The shales are overlain by the Valmonte Diatomite, formerly mined, and the Malaga Mudstone.</i>)
Cretaceous to Eocene		Basement elevated to form a low island, with no deposition
Jurassic	Franciscan Fm.	Shales, glaucophane schists, igneous rock, metamorphosed Pacific Plate (now thought to be around 120 MYA)

TABLE 1. Stratigraphy and palaeontology at the DMS&B marl pits according to Professor Ellis Bailey. My comments from other references in italics.



FIGURE 8.4 Photograph showing terraces close to Palos Verdes Hills, from Woodring et al 1946.

9. PALAEONTOLOGY

Most of the Pleistocene-age land animals found in the La Brea Tar Pits have also been found as fossils in the Palos Verdes Hills.^[18] Terrestrial animals swam across the island and their remains were sometimes incorporated into the terrace deposits. Fossil invertebrates were so common that thousands of complete shells have been collected. Scientific collections of fossils from the area date back to 1903, when Arnold published a book on the paleontology and stratigraphy of the Plio-Pleistocene of San Pedro.^[22] Today only a few Plio-Pleistocene sites remain, but there are many Miocene deposits of the Altimira Shale still accessible by fossil hunters.^[18] Only a few of the many quarries formerly worked in the region remain undeveloped.

Several technical papers have been published on the fossils yielded by the quarry,^[18,19,20,21] but the newspapers of the time provided much more graphic descriptions (Figure 9.1):

"World's Greatest Fossil Bed at Palos Verdes"
(San Pedro News Pilot 1923)

*They went back 1,000,000 years yesterday in digging down ten feet on the property of the Torrance Lime and Fertilizer Company at their quarries on the O.S. Weston Ranch South of Lomita.... Scientists spent the morning examining and appraising the various **bone, shell and rock specimens** as they came up in... excavations which promise to be among the most important in Southern California (1921).*

*Although solely for commercial purposes... the excavations have produced fossils from 5 to 1 million years before this era and have also yielded a portion of an immense pelvic bone..... In those ten feet of lime deposits is packed the recurring drama of 1,000,000 years.... **Great sharks battled...large trees... the Imperial elephant...the sabre toothed tiger** pounced upon him, sinking his 12 inch teeth into the helpless victim.... And almost yesterday, it seems, a **famished and desperate man...tunnelled** several yards, using a clumsy, heavy shale, scraper to the source of a stream..... They found traces of him today, a few bones mixed with those of the shark, the teeth of a wolf (April 1921).*

PASSED INTO GEOLOGY

There, in tens of thousands of years the imperial elephant, standing over fourteen feet in height and probably three tons, went down to his watering place, failed on one bright day or one dark night to watch his step and bogged one foot in a lime pit, struck out in anger with another foot, and his trunk got those caught also and passed out of life into geology.

However, before the elephant had perished in the mire the sabre-toothed tiger pounced upon him, sinking his twelve-inch teeth into the helpless victim. Relinquishing his grip when satiated, he dropped contentedly toward what he thought would be solid ground, only to sink into the same pit with the elephant and to join that immense creature and the sharks and the infinitesimal shell forms in furnishing a story book which would be opened with pick and shovel some day any number of thousands of years later.

BONES TELL TALE

And the great wolf, too, prowled and fed there, and perished there also, as his bones, along with those of the rest testify. Then, almost

In those ten feet of lime deposit is packed the recurring drama of 1,000,000 years. There was the bed of the ocean as attested by innumerable shell and fish deposits. There in the course of tens of thousands of years great sharks battled falling locked in the death embrace to the bottom of the sea. There after the waters had vanished and vegetation had sprung up, were large trees, portions of the forest remaining petrified amid other relics older by hundreds of thousands of years.

FIND HUMAN FOOT IN REMAINS OF DEBRIS AT LIME QUARRIES IN HILLS SOUTH OF HERE

Workmen in charge of the Torrance Lime and Fertilizer Company, South of Here in the hills, have dug up a petrified human foot, perfect in shape, and along side of this gruesome find was a battle-ax, dating back probably 100,000 years earlier than the earliest period heretofore established by means of fossil evidence, and are in themselves of great scientific value. In addition, the indications that the lime-pits are really animal graveyards on a scale heretofore unknown and from a time heretofore unauthenticated, have served to quicken the interest of paleontologists in what may yet be found in this treasure house, which has come from the dim morning of the world, and lies right at our back door.

Torrance Enterprise, April 1921

Torrance Enterprise,
May 1921

He had to do with the imperial mammoth, standing fully fifteen feet high and possessing spear-like tusks. The fossil remains of such a creature, along with fully a dozen varieties of tropical trees represented in superbly petrified units, are plentiful in the pit.

The giant sloth, too, has left proofs of his existence in the shape of a portion of his spinal cord. Likewise the primitive three-toed horse, the bear, the wolf, the tree-browsing camel and a strange kind of deer, and a rhinoceros-like ungulate with ferocious straightforward horns.

Torrance Enterprise, April 1921

DAVID STARR JORDAN Stanford University of California

October 13, 1921

Mr. S. Maus Purple,
301 Bradbury Building,
Los Angeles, Cal.,
Dear Mr. Purple:

I have gone over the things you sent with some care. It is a most extraordinary mixture of land and seastuff and only a geologist on the spot can tell how it came about. A few shells are from deep water—the rest from the shore.

The mammal bones seem to be fragments of whales, partly of beasts, which I cannot place, the sea lions perhaps. And these are in various conditions—some wholly petrified, others just plain bones. The latter probably came from Indian camps of much later date.

There are three species of Carcharodon, the Great White Shark. One is Carcharodon reversi, the small one with saw-edged teeth, the thick one is Carcharodon branneri, the big one is new to Science. This, if possible, I want you to send both specimens to me, for the United States National Museum. I want all the shark teeth if possible.

may uncover.

Dr. Jordan and Prof. Stark arrived from the north at 9:30 a. m., and after visiting the home of S. M. Purple, general manager of the Torrance company, at 1840 Middleton street, where about 700 fossils, taken from the quarry are stored, motored to the quarries with Mr. Purple.

They found the limestone beds particularly rich in shark's teeth, and found one tooth about four and one-half inches long and about three inches wide which was perfectly preserved. This, Dr. Jordan declared, appeared to be of a species hitherto unknown which were much larger than modern sharks.

FOUR SPECIES

"There are four species here at least," Dr. Jordan continued, "which have never been encountered before in this country, and several of them I believe to be entirely new. Then, too, there are teeth, of several different species which never before have been found in the same locality."

Another tooth which interested the scientists was declared to be that of a long extinct crocodile. Only a few like it, the scientists said, had been found before in America. So far no other fossilized remains of these long-dead fishes and reptiles have been found in the rocks than their teeth.

Torrance Enterprise, June 1922

PREHISTORIC BONES SHOWERED ON SAGES IN BIG QUARRY BLAST

Jaw bones, thigh bones, wish bones and bones of every other sort are believed to have come back into the light after an interval of a million years or so, following the huge blast at the Lomita pits that was fired the other morning in honor of a big party of scientists and other visitors that the Los Angeles Chamber of Commerce sent to the pits as the guests of the Decomposed Marine Shell Fertilizer Company (D. M. S.).

Some examples of stories relating to the fossils discovered in Purple's Quarry

FIGURE 9.1 Some fossil stories about fossil discoveries in the Torrance Lime and Fertilizer quarry, from the Torrance Enterprise, 1921.

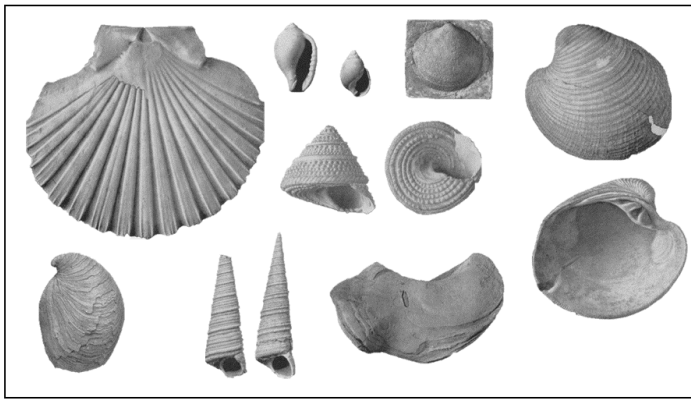


FIGURE 9.2 A selection of molluscs from the Palos Verdes Hills, Starr Jordan 1921.

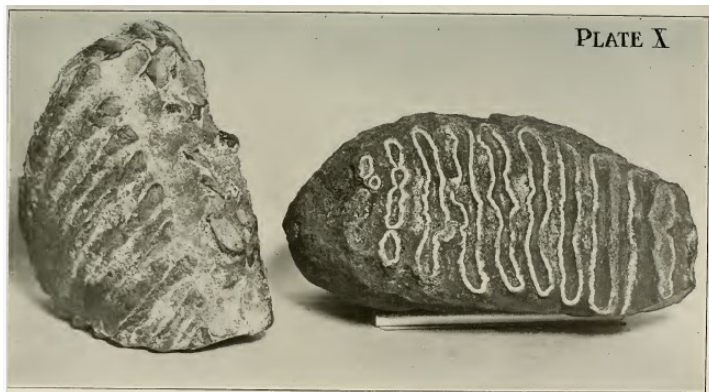


FIGURE 9.5 Imperial elephant (mastodon) teeth from the Torrance Lime and Fertilizer quarry, Starr Jordan 1921. The mastodon tusk is from the Torrance area 1921.

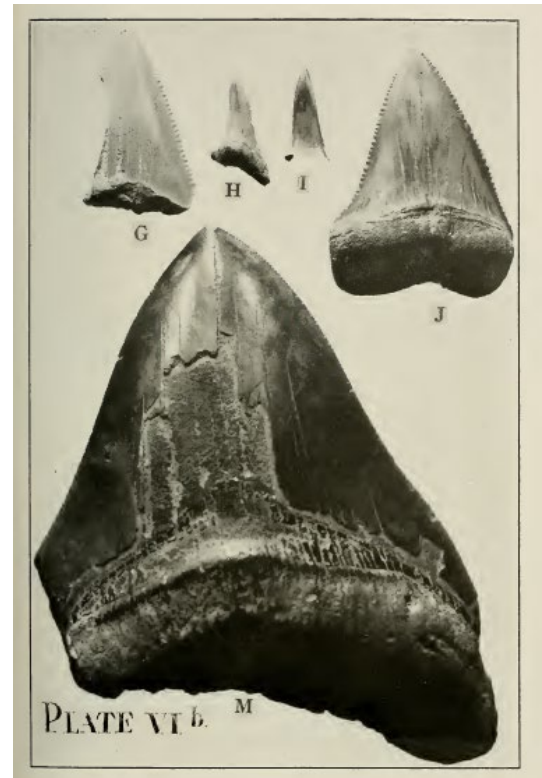


FIGURE 9.3 Great White Shark teeth from the Torrance Lime and Fertilizer quarry, Starr Jordan 1921.

Workmen in charge of the TL&FC...have dug up a **human foot**, perfect in shape, and alongside of this grewsome find was a battle-ax... the foot rests on its outer side and it is exceptionally long In addition to the "near-foot" and the human weapon there are bones... that ape-like man was in tropical surroundings and luxuriant foliage...He had to do with **the imperial mammoth**, standing fully 15 feet high and possessing spear-like tusks. The fossil remains of such a creature...are plentiful in the pit. The **giant sloth**... the primitive **three-toed horse**, the **bear**, the **wolf**, the **tree-browsing camel** and a strange kind of **deer**, and a **rhinoceros-like ungulate** with ferocious straightforward horns. But most terrifying of all, perhaps, was the **saber-toothed tiger**...having teeth some fifteen inches long...(1921).

Starr mentioned that a few of the shells were from deep water, the rest from the shoreline (Figure 9.2).^[20] There were bones of **whales** and (probable) **sea lions**. There were four species of **Carcharodon** (Figure 4.3), **the Great White Shark** and several other **shark and ray species** (more than 100 teeth in all). There were also sea lion teeth, tusks and bird bones. Land mammals included paws of a bear, vertebrae of a giant sloth, bones of a **great wolf** and of a **lion**, the nasal bone and teeth of an **imperial elephant** (which "weighed 6 ¾ pounds and measures 8 ½ inches across the chewing surface": Figure 9.4), the tusk of the **saber tooth tiger** and a **hippopotamus** and bones of the **five toed horse**. One important discovery was the tooth of a **prehistoric crocodile** (An "animated leather lizard...the first found west of the Nile"). Other authors have reported the tusks of mastodons (Figure 9.4) and the remains of **several fossil whales** over the years, including a 2 million year old whale from the Palos Verdes Hills, near Lomita, found in 1921.^[18]

10. SUMMARY

Without a doubt the gift of a simple envelope sent me down a fascinating geological rabbit hole. It also served to demonstrate the amazing resources that are out there for the intrepid researcher. Genealogical records, the census, newspaper archives and technical published papers can be used to paint an incredibly detailed picture of life in the 1920s (I have skipped a lot of the mundane stories from the Torrance Herald and Enterprise newspapers but feel free to explore the 1920s newspapers further^[9]). Added to this was a really interesting geological story that provides direct analogues to Cretaceous sedimentary deposits of the Western Interior Seaway, along with the chance to explore a "La Brea" fossil fauna preserved in a completely different depositional setting. Finally, I salute the maverick S. Maus Purple, who showed that even the most amateur of geologists can have their day in the limelight, and end up having a species of Great White Shark named after them.

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