This was Copied from the book he mentions just at the time of his death Feb 13 - 1916
He was my cousin Wm. Farren son of Wm. Farren Turners Falls - and worked for the Atlas Powder Co - Tamaqua Pa.

In my early days in Tamaqua Penna. I lived with four other men in the Club House furnished by the Atlas Powder Co. In the 1870s

Weather permitting on Sunday afternoons we took walks out into the country and often ran into the ruins of Black Powder Mills which in previous days had supplied the many Anthracite Coal mines in the neighborhood.

IT was ~~This~~ from the owner of one of these mines that I obtained the Book from which I am going about to quote the information given about The House-Tunnel.

When this man died his widow in accordance with the custom at that time sold off his effects

3) A friend of mine who was a neighbor bought several Books ~~among which~~ one being a Treatise on Explosive Compounds Machine Rock Drills and Blasting by Henry S Drinker EM a graduate of the Lehigh School of Mines and author of several Books on Tunnels. covering the Hoosac Tunnel This Book was Published in 1883 by John Wiley & Sons New York.

As a foreword to the description of the Hoosic Tunnel Mr Drinker advises that he obtained his Information from the Files of Mass State Engineers ~~and~~ of the the Mass Legislative Reports ~~and~~ Mass State Library etc. as well as other Sources

~~It seems apparent~~ that he made

3) These latter included the Records of the Contractors and Engineers particularly Mr Walter Shanley and others too numerous to mention.

IT is apparent that this is a very complete and accurate account of the Construction of the Tunnel.

He admittedly eliminated some of the details on financing etc and I will eliminate additional information that I do not think of interest.

Mr Drinker in starting this Study pointed out that as early as 1825 they considered Tunnelling Roosac MT to provide a water way from Boston to the Hudson by means in part by employing the Deerfield and Hoosac Rivers

The proposal was found to be practical but Shortly thereafter

Railroads came into favor & the water way plan was dumpsted.

In 1848 an application was made for a charter to build a Railroad from Greenfield Thru the Deerfield and Housatonic valleys to connect with a railroad leading to Troy New York A Charter was granted limiting the stock to 3½ Million Dollars

In 1854 the Mass. Legislature Granted the Troy and Greenfield Railroad Co permission to Build a Tunnel Thru the Hoosac Mt ~~at a cost not to exceed~~ and lent Credit to the Amount of 2 Million Dollars

On the basis of labor and Material costs at that time a Tunnel 24ft wide 20 ft high arched at the top and 2400 ft long could be built for this amount.

5) Working from both ends of 2 faces the time required was estimated at 1556 Days. If it was decided to sink a shaft from the top of the Mt to the Mid Point of the Tunnel thus creating 2 more faces the time would be reduced to 1054 days ~~1556~~ approx 4 1/8 + 3 years respectively

In 1855 a contract was made with E W Serrell & Co ~~to complete the~~ to build a road to the Tunnel site.

This Contract fell thru and was assumed by W Haupt & Co. in 1858 they were to receive 2 Millions $ in Mass Bonds, $900,000 in Mortgage Bonds of the Company and $1,100,000 in Cash

Work was started but discontinued in July 1861 due to a controversy over the method of payment.

6)

at that time the proposed length of the Tunnel was 24 41C ft. Haupt had excavated 2200 ft on the east End and 1850 ft on the west End leaving 20,166 ft uncompleted.

At this point the Troy and Greenfield Railroad Co surrendered to the Commonwealth their Charter and all other property.

Up until this time all drilling had been done by hand but air drills had now been designed so the state built a Dam across the Deerfield River and by means of a Canal created a 36 ft drop that ran water wheels which in turn powered the compressors that provided the air.

The method of driving the Tunnel was

J) The air was delivered to the face Thru an 8" pipe.
This pipe was laid in a ~~the~~ Chanel in the bottom of the Tunnel. which ~~as~~ besides serving as a drain for the water encountered provided room for a 3" pipe for ~~water~~ water for the drills ~~and~~ a 4" pipe for Gas for Lighting and a 12" pipe for air for ventilation
Upuntil this time Candles were used as the source of light and were listed as ~~an~~ essential part of the costs.
As an example one estimation showed the use of 3200 lbs of Candles over a period of 7 months.
On Jan 1 1864 the ~~Central~~ a Shaft elyptical in shape 21 x 15 ft was started ~~at~~ the top of the mountain above the midpoint of the Tunnel.
This ~~was completed~~ reached the Tunnel grade on Aug 13 1870 — about 7½ years later - the work being completed by the Shanley Construction Co.

8) In 1866 under the supervision of Mr. Doane the Chief Engineer Experiments were completed with Nitroglycerin.

This product was not invented by Nobel but he discovered and held the Patents on its use as a Blasting Agent.

Thru Licenses and joint ownerships of Plants through out the world Nobel accumulated the Fortune which was the basis of the Nobel Prizes for Peace and other endeavors.

In 1966 progress at the rate of 96 ft per month was made at the East Portal. but due to a difference in the Rock consistency trouble was experienced at the West Face.

At the East End the Rock was uniform and while considered Easy to Drill was thought to be difficult to Blast.

At the West End it was non uniform ~~not~~ decayed in places. difficult to Drill in others and

9) thus created several problems.
At the East End it was found that after being driven the Rock forming the sides and roof of the tunnel when exposed to the air tended to decay. crack and permit boulders to become disengaged.
To eliminate this the Tunnel was Brick lined and this contract was given to B N Farren who ~~effected an area~~ completed about 132 ft From Aug to Nov.
During this year Mr Farren took the contract to complete the Arching of the West End.
In the mean time in order to solve some of the problems in the West End a shaft 314 ft deep 13 x 8 ft had been sunk between the Central Shaft and the West End opening
IT was decided to drive an adit or small Tunnel west from the shaft to ~~the~~ meet the

10) West end workings

The Tunnel ~~was~~ or adit was to be approximately 6ft high and 4ft wide and the Contract was assumed by Mr Farren.

During this year Mr Doone resigned as chief Engineer. ~~The~~ ~~was~~ as noted previously he was responsible for the original Trials with Nitroglycerin and he also changed the methods which permitted the use of Improvements in Air and steam Drills.

The adoption of these methods later permitted obtaining the full effectiveness of Nitroglycerin.

After Mr Doons resignation the work proceeded under Mr Alvah Crocker as President Commissioner until Oct 1907 when an accidental fire destroyed the Central Shaft House and Shaft Killing 13 men.

At this point the Contractors surrendered their Contracts and

11) Work Stopped.

Mr Farren had completed an additional 350 ft of Brick lining during this year.

On Jan 1 1968 when work was again proceeding on all faces it was noted that 509 men were being employed about 2/3rds in the troublesome west area

During this year ~~the~~ a connection was made between the West shaft and the West End adit so now there was the free flow of water from the West Shaft to the outside.

At this time arrangements had been made with Mr McBrey of North Adams to provide Nitroglycerin and a new drilling system was developed to permit its effective use.

The original estimation stated that the ~~holes~~ depth of the holes could be increased from 30 to 40 inches. And because of its greater strength and

12/ Shattering effect as compared to Black Powder. ~~the full depth of the holes~~ the rock was broken to the full depth of the holes where as previously 6" or more of Rock was often time left.

On Dec 24th 1968 it was decided to discontinue supervision by the state and a Contract was let to Shanley Bros for approximately $4,600,000 for completion of the Tunnel by Mar 1 1974 with the possible option of 6 months additional.

It was estimated that up to Jan 1 1969 that the Tunnel had Cost Close to 3 Million Dollars so that now the Total Cost would be $7,600,000 as compared to the original estimation of 2 million.

On Jan 1 1969 all work had been suspended except the Completion of Mr Farrens Contract.

B) Covering the Brick Arch on the West End.

This was finished in Feb 1969 and this work taken over by Shanley Bros in April.

Shanley Bros started working in March and by Dec 1969 had 700 men on the job.

In Aug 1970 as noted previously the Central Shaft reached the tunnel level but because of the necessary Trimming and Timbering no advance ~~was made~~ on these new faces was made until Oct.

On Oct 3rd a heavy Rain storm caused a creek adjacent to the West End to overflow the water reaching a height of 15ft above the arch.

The West End workings were completely flooded and one man was lost.

During 1970 the improvement in Drills substitution of Air ~~for~~ + steam for hand drilling saved 2/3 in the cost of this operation

19) During this year Liquid Nitroglycerin was in General use. but later a 75% Mixture with an absorbent clay called Mica Powder was used in Roof and some bottom holes.

It was noted that during the next 5 years about 450,000 lbs of Nitroglycerin and 100,000 lbs of Mica Powder were used by the Shanley Bros.

~~Work proceeded with~~

Work now proceeded steadily with the rate of progress being increased as further experience was gained with ~~found~~ the improved drills etc.

Finally on Dec 12 1872 the East Heading met the one being driven East from the Central Shaft and on Nov 27th 1873 the West heading met the one driven West.

Shanley Bros concluded their Contract Dec 22 1874 (about 4 months late) but prior to this on Nov 19 the State had entered into a Contract

17 With B N Farren to do considerable archins and enlarging not covered by the agreement with Shanley..

Shanley was given $131,000 over their contract to pay for Flood Damage, additional archins required etc

This brought the cost of the Tunnel to $7,727,424.

Broken down to cover Mr Farrens work it was shown that he was paid 1,531,659 making the Total $9,258,563.

IT was therefore assumed that the final cost of the Tunnel would be $10,000,000 with 4 million addition being Spent for 44 miles of Railroad including $200,000 paid to Southern Vt railroad for their property

16) The first Engine was run Thru
Feb 9 1875
The first passenger train Oct 4
1875
The Tunnel was declared
Completed July 1 1876
Including ~~interest the~~
approx. 3,300,00 interest
the total cost ~~was~~ Tunnel Project
was $7,322,000

1876
1858
18

4½

2 - 9¼

17¼