name of *marsh gas,* and it is known to coal mines as fire damp. The second member of the series is C_4 H_6, and the third is C_6 H_8. The reader hardly needs to be told that the fourth is C_8 H_{10}, and he is able to determine the twentieth. The common difference of the series is C_2 H_2, and the general formula for the series is $C_n + H_{n+2}$.

We append a table showing the specific gravity and boiling point of a part of the series. The first four are gaseous at ordinary temperatures, and the specific gravities are given in comparison with air:—

		Specific gravity.	Boiling gravity
1	C_2 H_4	0·554	...
2	C_4 H_6	1·04	...
3	C_6 H_8	1·52	...
4	C_8 H_{10}	2·01	32°
5	C_{10} H_{12}	·628	86°
6	C_{12} H_{14}	·669	158°
7	C_{14} H_{16}	·699	198°
8	C_{16} H_{18}	·726	243°
9	C_{18} H_{20}	.747	278°
10	C_{20} H_{22}	·757	321°
11	C_{22} H_{24}	·766	359°
12	C_{24} H_{26}	·766	408°
13	C_{26} H_{28}	·792	423°
4	C_{28} H_{30}	·800	460°
15	C_{30} H_{32}	...	496°
16	C_{32} H_{34}	...	527°
17	C_{34} H_{36}	·825	...
25	Paraffine	·870	...

—*Scientific American.*

The Palos Petroleum Trial.

The *Scientific American* says:— "The first experimental trip of the *Palos,* June 14th, with petroleum as fuel, resulted in a total run of 25 nautical miles in I hour and 55 minutes, or a little over 13 knots an hour. The reported result is almost incredible, as the *Palos* is only an 8-knot steamer, with coal. Four barrels of oil were consumed on the trip, doing the work of eight tons of coal, The oil drips into a hot iron retort, where it is converted into gas and mingled with steam and air in exact proportions to produce entire combustion and the most intense heat, which is distributed to the heating surface of the boilers with such effect as to raise steam in 25 minutes, where three hours were required with coal. Such is the case thus far, as made out by the friends of the improvement.

We add the following letter from Engineer Alban C. Stimers relative to this interesting trial and the subject of petroleum for fuel. It was addressed to the New York *Times:*

N, Y, Monday, June 17, 1867.

I observe in your editorial remarks in Minor Topics, in adverting to the Boston petroleum fuel experiments, in this morning's paper, an inquiry regarding the "original source of the steam that is taken from the boiler and passed into the retort that generates the vapors that make the heat that raises the steam in the boiler."

Having closely observed the various efforts made during the past five years to employ petroleum in lieu of coal for a steam fuel, I take the liberty to offer the following explanation in reply to your inquiry.

The introduction of superheated steam into the retort where the oil is vaporized is not essential to the making a fire and getting up steam, but it is to burning said vapor with the completeness of combustion necessary for it to compete with coal as a steam fuel. In burning the vapors of petroleum it is necessary that every particle of the vapors shall come into close contact with a corresponding particle of atmospheric air; bnt air and the vapors of the oils appear to have the same repellant qualities as oil and water, and do not mix enough to prevent the formation of a thick black smoke. and the heat developed is comparatively very small. All who have attempted the use of petroleum for a steam fuel, appear to have early learned the great advantage of introducing superheated steam to the vapors. When this is done, the air mixes readily with the compound, and a more complete combustion is effected.

Although, as I have already stated, steam could be raised in a boiler from burning the oil vapor only, yet it is done much more quickly and pleasantly if a supply of steam can be had, and I observed that on Friday last the fires of the *Palos* were assisted with steam from a sister vessel, the *Leyden,* which lay alongside.

The first experiments tried to test the practicability of employing petroleum for generating steam were by Shaw and Linton, in Philadelphia.

I was member of a board of Naval Engineers, ordered by the Department to conduct and report upon the experiments. They continued during five months, and our report is dated May 5, 1863.

In that arrangement, "the apparatus used was an ordinary tubular locomotive form of boiler containing fifteen tubes, two inches in diameter and fifty- six inches in length; a small steam engine, in connection with it, operating a pump supplying water to the boiler; with an additional boiler of very small dimensions, placed in a heating apparatus, to provide a steam jet, previous to firing up with the oil, in the absence of other means for procuring the necessary artificial draft until steam was raised in the large boiler."

This would be a good arrangement fer Colonel Foote to employ with his process. The great merit of Colonel Foote's process over all those which have been tried in this country and in England, consists in his forcing the air, necessary for the combustion of the oil, directly into the retort where the latter is vaporized, and as superheated steam is introduced simultaneously, *the air becomes thoroughly mixed with the vapors before they issue from the burners* and the combustion is consequently perfect when the proper proportions of air and oil are maintained. This desideratum is never attained in any other process yet brought to my attention.

When an inventor comes to me and describes the brilliant white flame which he produces with his greatly improved petroleum burner, I know that he cannot compete with anthracite coal in economically generating steam. And Colonel Foote is the only one who has shown me a fire where all that was visible was the blue hydrogen flame, which every chemist will understand is—with such a combustible—the hottest attainable fire.