**Appreciating Carnatic Music**
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Lecture – 25
Generating the 72 mela-s

What Venkatamakhin essentially advanced was, he worked out the number of combinations of the twelve swarasthanas. One essential consideration was that the, each scale had to have all the seven swaras in order. Let us look at our schema of the twelve swarasthanas.
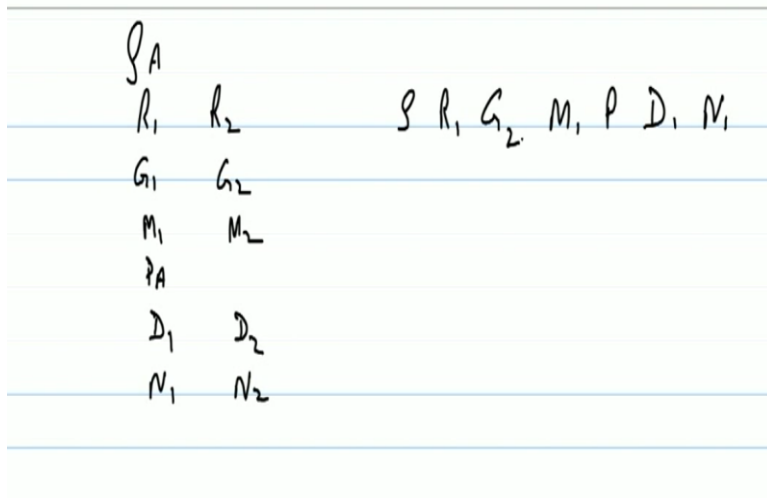
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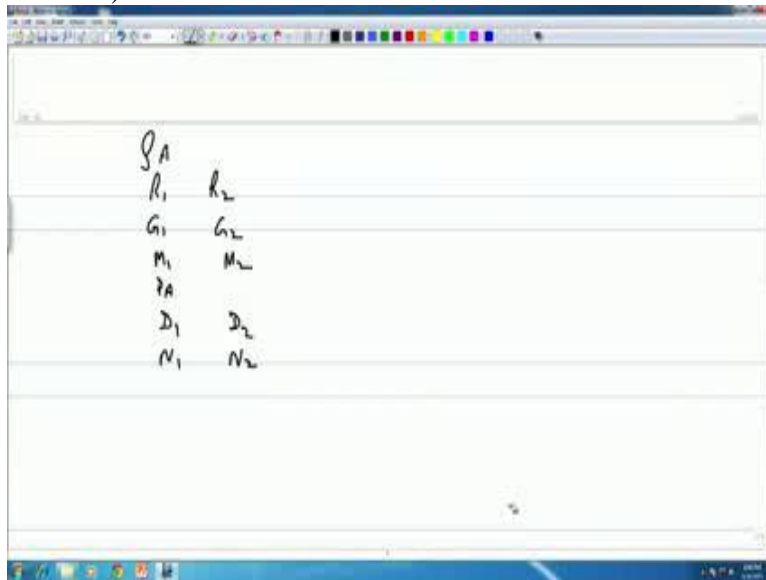
We have "sa, ri one, ri two, g one, g two, ma one, ma two, pa, da one, da two, ne one, ne two". We need to figure out, how many combinations of the seven swaras are possible.

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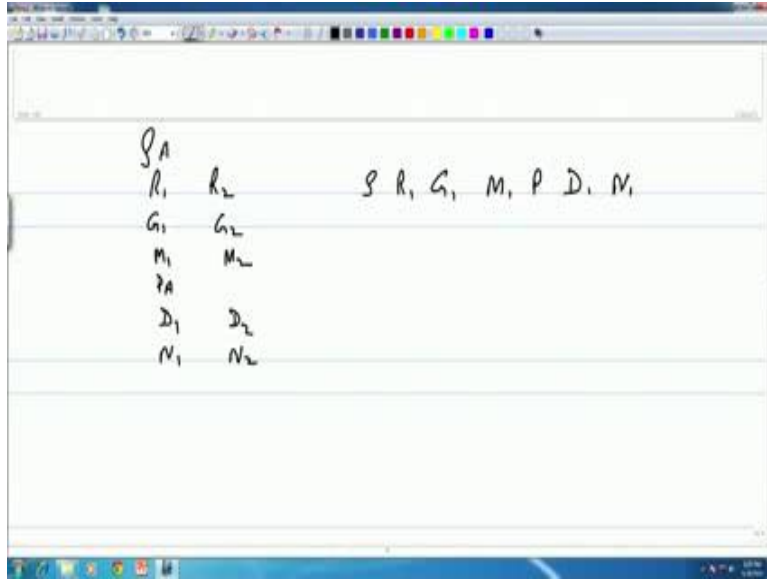
Then we have these twelve swarasthanas. So just to give you an example, "sa, ri one, g one ma one, pa, da one, ni one"; this is a combination or possible combination.
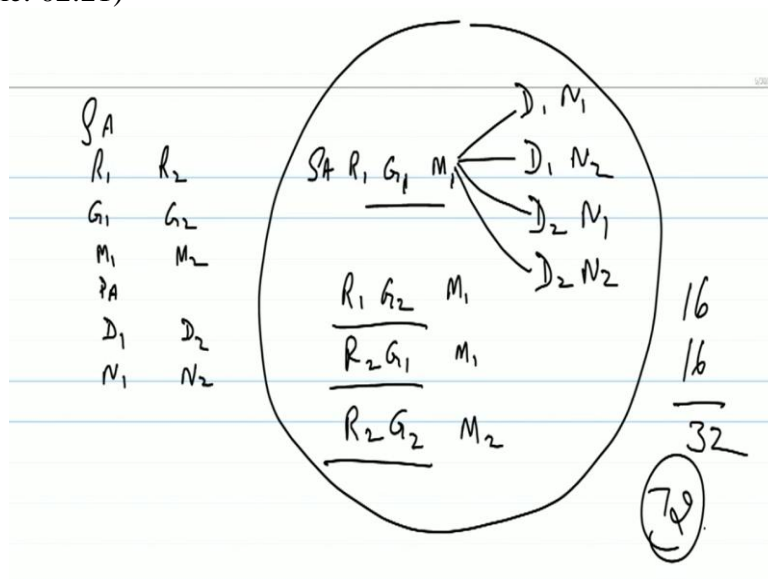
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Or we could put this as "sa, ri one, g two, ma one, pa, da, ni"; This is a possible combination.
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Or writing to this "ri one, g two, ma two, pa, da one , ni one"; this is another combination possible.

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Now, if you just take the way of, just trying to figure out, how many combinations are possible. Let us say, we have "sa, ri one, g one", ok, and we have "ma one", with this how many combinations of da and ni are possible. We have the first combination possible is "da one, ni one", second combination possible is "da one, ni two", third combination possible is "da two, ni one" and fourth combination possible is "da two, ni two". So, with "sa, ri one, g one, ma one", there are four combinations possible.

So, also with "ri one and g one" four combinations are possible. Where "ri one g two, ri two g one ri two, g two and ma one", so we have the total number of combinations here, with four of these possibilities, and just "ma one", it is sixteen. Sixteen possible combinations are there; because with each of these combinations of "ri and ga", four are possible.

So, four are possible for this, four are possible for this, four are possible for this, so we have sixteen, we have sixteen possible combinations of all this "sa, ri, ga, ma, pa, da, ne with ma one". The same thing will apply with "ma two". So, we have sixteen plus sixteen, thirty-two possible combinations of these swarasthanas are there. When you want a sampoorna scale of seven swaras. But what venkatamakhin arrived at, was a number of seventy-two.

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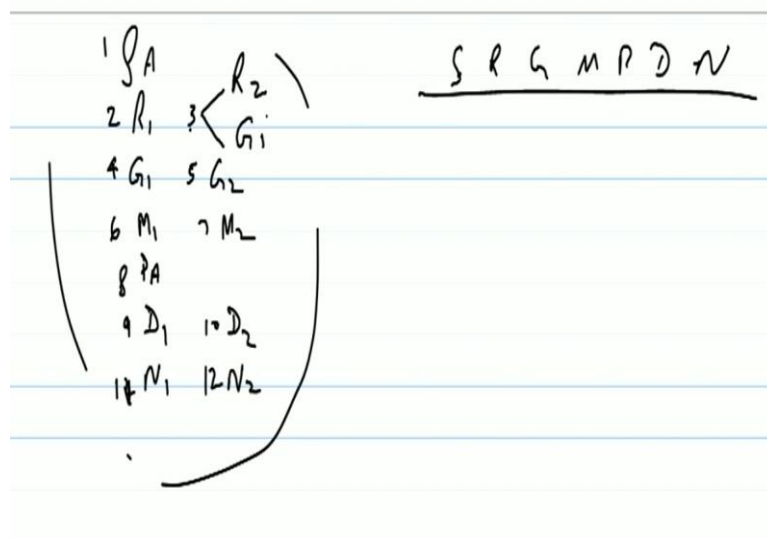
Now how did he do that, on this method, as you can see a combination of "ri one, ri two" is not possible. You cannot have a scale which tells, suppose we have number the swarasthanas: This is the first swarasthana, this is the second swarasthana, this is the third, fourth, fifth, sixth, seventh, eighth, ninth, tenth, eleventh and twelfth.

So, we cannot have a scale which has the combination of the second and third swarasthana. That is not possible. Now, what venkatamakhin did was essentially to make that possible. He reworked a nomenclature of these swaras. We speak of "ri one, re two" and we need a scale to have all the seven swaras "sa, ri, ga, ma, pa, da, ni", we need all the seven swaras. Now, if we have swarasthana two and swarasthana three, then we will not have "g". So, in that case it

is not a sampoorna scale. So, what can we do, that a scale which has swarasthanas two and three is also possible.

To accommodate this, to make this possible, what he did was, quite a genius really, this third swarasthana, he gave it, this is of course, ri two. But this is also "g one" instead of talking of two varieties of "ri two", two varieties of "g" and two varieties of "da" and "ne" each. He spoke of three varieties each of "re, ga and da, ne" and he distributed it like this.

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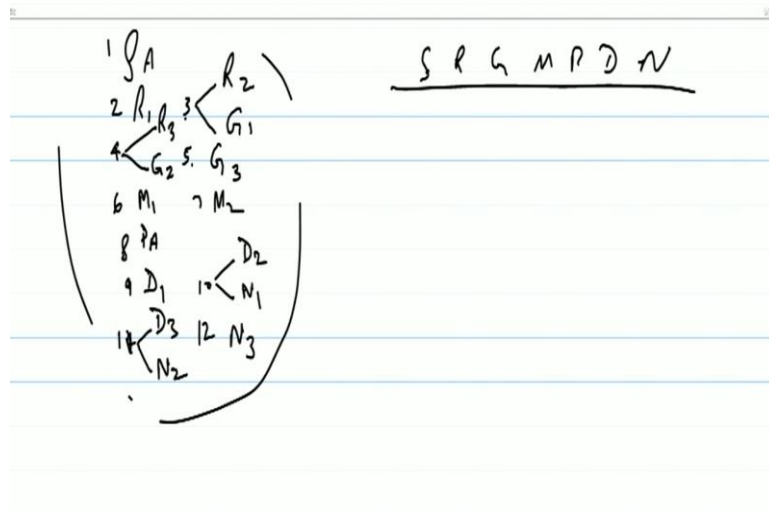
Now the fourth swarasthana, this is "ri one, ri two and ri three" or this also "g two" and fifth swarasthana will be "g three". So, essentially the third swarasthana could be either "ri two or g one", fourth swarasthan could be either "ri three or g two", fifth swarasthan has to be "g three". So, also with "da and ni", tenth swarasthana is "da two and ni one", the eleventh swarasthana is "da three and ni two" and twelfth swarasthan is "ni three". And he gave technical terms for all these which you can see in the slide.

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The first variety of every note is called shuddha. Shuddha ri, shuddha ga, shuddha ma, shuddha da and shuddha ne. The second variety of "ri and da" are called chatusruti rishabha and chatusruti deivatha. The third variety of "ri and da" are called shatsruti rishabha and shatsruti deivatha, gandhara we have, shuddha gandhara, sadharana gandhara and antara gandhara, nishada we have, suddha nishada, kaisiki nishada and kakali nishada. Now, this is the terminology that even used today.

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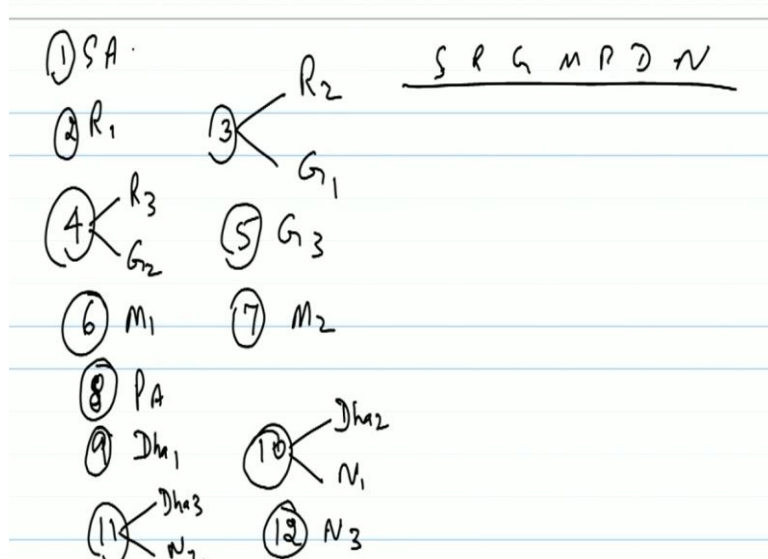
So, with this, it is possible to have a combination of one, two, three 'sa, ri one'. This is first swarasthan, second swarasthana, third swarasthana can be 'ri two and g one', the fourth swarasthana is 'ri three' or 'g two', fifth swarasthans is 'g three' and sixth swarasthana is 'ma one' and seventh is 'ma two', eighth is written as 'pa', the ninth is 'da one', tenth could be 'da two or ne one', eleventh could be 'da three or ne two' and twelfth is 'ne three'.

These are all the swarasthanas, that we have scales of, sampoorna scale "sa, re, ga, ma, pa, da, ne". So, where earlier we could have (Singing Starts: 10:31) (Singing Ends: 10:45). Now what we can have, (Singing Starts: 10:47) (Singing Ends: 10:52), because this, the third swarasthana (Singing Starts: 10:55) (Singing Ends: 11:08).

But this, becomes ga only when this is also there, (Singing Starts: 11:15) (Singing Ends: 11:22). If this third swarasthana were not seen as a variety of ga, then you can only say (Singing Starts: 11:31) (Singing Ends: 11:34).

Which then did not give us a sampoorna scale, ga is not there? What he did was (Singing Starts: 11:40) (Singing Ends: 11:45) this in fact, is the first possible scale on this scheme. In this method, this is the first possible mela (Singing Starts: 12:06) (Singing Ends: 12:15), which would not be possible, except for this way of, this kind of nomenclature. He tweaked with the nomenclature essentially, so that this kind of scales are also possible.

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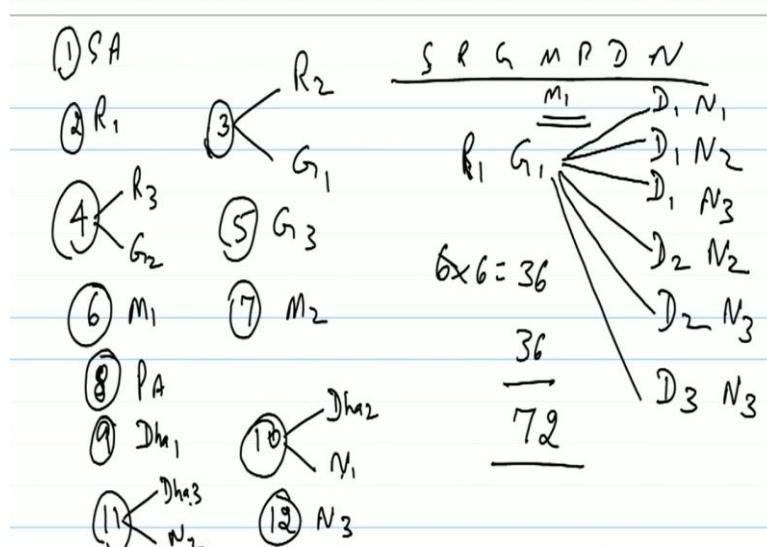
Now on this, let us see how many are how many possible melas are there. That is, this 'ri one' and 'g one' and we say, we have 'ma one', how many possible combination of 'da and ni' are there. That is 'da one and ne one', of course. 'da one' and this 'ne one' and next is 'da one' and 'ne two', third is da one and ne three, fourth is da two and ne two, da two, ne two are not possible.

Because they are the same swarasthana, actually 'da two and ne two' is the next one. Then 'da two, ne three' and finally we have da three and ne three, da three' cannot combine with ne one or ne two. Because ne one is lower than da three and ne two is actually the same swarasthana as 'da three'.

So, we just have one set of 'ri and ga',' ri one and g one'. We have one, two, three, four, five, six, six combination of 'da one, ne one and da and ni' possible. So, with 'ri one and g one', six combination of 'da and ne' are possible and six possible combination of 'ri and ga', also six possible combination of 'ri and ga' also. So, you have six into six, thirty-six combination will be possible with just 'one ma', and another thirty-six possible with the other 'ma', the augmented 'ma', the prathimathi ma as it is called and then you have a number seventy-two.

This is the seventy-two melakartha scheme, as propounded by venkatamakhin in his chathurdandi prakashika. Immensely influential work and this idea has firmly estranged in the minds of all carnatic musicians for the good and the bad.