INTRODUCTION
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This thesis makes an attempt to present an explanatory phonology of Lucknow Urdu, as spoken in the city of Lucknow by the artisans, craftsmen, traders, labourers etc. The phonological analysis undertaken here is carried out in the light of the phonological principles of Form-Content Linguistics.

We make an attempt to introduce the theory with the help of four sections, namely A, B, C and D. In Section-A, we briefly present the historical setting of Lucknow Urdu. In Section-B, we deal with the field procedures used for the collection of data. In Section-C, we briefly present the theoretical background of the proposed analysis and the scope of the study is discussed in Section-D.

Section-A: Historical Setting of Lucknow Urdu

No one knows, definitely, when Lucknow first became populated, who its founder was or how it got its name. By one account, it is said, that when in 1590 Emperor Akbar divided the whole of India into twelve Provinces, Lucknow was in the first instance, chosen as the seat of the Subedar, or Governor of Avadh. At that time one Saikh Abdur Rahim, an impecunious nobleman of Bijnaur (U.P.) went to Delhi, became a courtier and ultimately became an official
in the imperial service, was granted land in Lucknow which he acquired with great pomp and show. Later he built a strong fort on the land, which had twenty six arches in one portion on which the architect had engraved two fishes on each arch - the fort was thus called Machi Bhavan - Bhavan could be a corruption of 'bavan' for its 52 fishes. The architect who designed this fort was Lakhna. Some say that because of his name the town was called Lucknow.

Lucknow is an important city of Uttar Pradesh, not only for its status as a state capital, but also for its great historical importance. It is bounded on the east by Bara Banki, on the south by Rae Barelli, on the south-west by Unnao, on the north-west by Hardoi and on the north by Sitapur. Lucknow has a total area of 2,528 square kilometres and a population of about 27,62,801 lakhs approximately (Prasad; 1992: 19). Lucknow is transversed by two rivers, the Gomti and the Sai.

Lucknow has been an important school of Urdu prose and poetry. Lucknow became a centre for Urdu only after the Delhi throne collapsed under British pressure. The Delhi poets shifted one by one to Lucknow for want of patronage and found a new lease of life under the magnificent patronage of the Nawabs of Oudh.
Diagram 0-1: Geographical Map of Lucknow
The first poet to write masnavis, a form of poetry which has always been considered the most important and most forceful, was Mir Ghulam Hasan, the son of Mir Zahik, who came to Lucknow in his childhood with his father in 1766, wrote the famous masnavi Sehr ul Bayan in 1785. He grew up in Lucknow society which influenced the writing of his masnavis. At the time, Mirza Muhammad Taqi Khan Havas wrote his masnavi Laila Majnun and taste for masnavis increased in Lucknow. Later on many poets of Lucknow like Atish, Nasikh, Pandit Daya Shankar Nasim, Nawab Mirza Shauq, Tahir Lakhnavi and numerous others, started writing and popularising Lakhnavi style of poetry.

Another important early form of poetry is marsiyya, the elegy. As the Shia kingdom of Avadh became the religious successor to the defunct safair monarchy, a great impetus was given in Lucknow to mourning assemblies. The composition of marsiyas was accorded such value that this art reached exceptional eminence. In fact these shia practices are the source of Lucknow’s cultural rise.

It is also a fact that Urdu prose-writing originated in Lucknow with the publication of Mirza Rajab Ali Beg Surur’s Fasana-e-Ajaib and other works. After this, Nau ratan was also published by Mahjur, a product of Lucknow community.
Politically, Lucknow became well known with the appointment of Nawab Burhan-ul-Mulk Sadat Khan as the Subedar of Oudh, by the Imperial Court in 1732. Lucknow shot into political limelight during the period of Nawab Shuja-ud-Daula (1753-75). He was a warlike ruler who maintained full military decorum and traditions. He participated actively in the battle of Panipat. He played a significant role in the fight against the Britishers. He was succeeded by Nawab Asif-ud-Daula (1775-97).

Unlike his father, he did not possess any of his military characteristics and skills. It is said that Asif-ud-Daula destroyed Faizabad and established Lucknow.

Hindu Mythology regard it as a gift by Shri Ramchandraji to his companion, Lachman, during his externment from Ayodhya. About Muslim conquest and settlement in Lucknow, the first description is found in the statement of Syed Salar Masood Ghazi (1030). Bakhteyar Khilji attacked Lucknow in 1202 and then Muslims started settling there.

Emperor Akbar had a special liking for Lucknow. He made Lucknow the capital of one of his regions when he divided the country into administrative regions. During Akbar's reign, Lucknow became a centre of trade and commerce.
The reign of Asif-ud-Daula was marked by lavish expenditures on construction of Imam Baras and beautification of Lucknow. He was a benevolent and generous ruler and his fame reached far and wide attracting many top poets, writers, doctors, artists and singers to Lucknow.

Nawab Asif-ud-Daula was succeeded by Nawab Saadat Ali Khan (1798-1814), who had to part with half of his kingdom to the British. He patronized arts during his so called reign.

After him Ghazi-ud-Din Haider (1814-27), who was another spoilt ruler, emerged on the scene.

The other successors were Nasir-ud-Din Haider (1827-37), followed by Muhammad Ali Shah (1837-42), who built the new Imam Bara. He was followed by his son Amjad Ali Shah (1842-47), who was a charitable man and his reign was a boost for saints and Sayyids. His son Vajid Ali Shah (1847-56) was another gay man who spent his time in the company of musicians, courtesans and women. This reign came to an end in 1856 when Lord Wellesley, the Governor General, decided to annex Oudh to the British Raj.

Inspite of being a metropolitan state, Lucknow has retained its old world charm in the form of historical landmarks like Bara Imam Bara, New Imam Bara, Roomi Gate,
Shah Najaf ka Imambara, Panch Mahal, Firangi Mahal etc. The old city still emanates the aroma of the bygone days with its old mohallas like Chowk, Sahadat Ganj, Hussainabad, Nakhas, Jihulia Ganj, Billoujpura, Malekhan Sarai, Daliganj, Khadra, Basmandi etc. These mohallas constitute the Muslim population who are Urdu speakers and are generally artisans, coming down ages, mostly illiterate, but excellent in their arts and skills. The cotton industry is very old and is still surviving, though not very thriving now. Chikan work is the most important industry connected with cotton. The chief patterns are 'muri', 'jali', 'tuppa', 'pachia', 'zanjiri', 'daraj', etc. made on fabrics of different textures and qualities.

Lucknow is also well known for its 'zardozi' work (gold and silver embroidery), manufacturing of silver and gold laces popularly known as 'lachka', 'kalabatun', and 'lais', a corruption of the English word. It is also known for its exquisite jewellery, bidriware (a kind of silver work), ivory carvings, wood carvings, potteries, glass industries, tobacco and perfumeries etc.

Lucknow has an almost equal population of the Hindus and Muslims. The Muslims are divided into two major sects - shias and sunnis. All festivals are celebrated with full religious spirits by both alike. Some of the old sports like
'patang bazī' (kite flying), and at times 'kabutar bazī' (pigeon flying) remind us of the old era and bygone splendour.

Every day speech of the masses and uneducated show heavy traces of chaste Urdu which is the result of a long drawn social and cultural impact of Urdu. It is interesting to note that the speech of a majority of non-Muslims is also influenced by significant words from Urdu.

Section B: Field Procedures

Data is a prime tool in any linguistic research. The data collected for the present analysis is carried out through fieldwork, which is known as field linguistics. Field linguistics is primarily a way of obtaining linguistic data and studying linguistic phenomenon (Hockett; 1948: 119). Field linguistics is a wide term which does not limit itself to data collection only, but also extends to handling and analysis of the data.

The present phonological analysis deals basically with two areas outlined below:

Section B1: Collection of the Data

The complete process undertaken in the collection of the data for the study here, includes two major tasks,
namely, selection of the informants and actual process of
data collection. The following subsections present the above
mentioned procedures.

Section B1(a): Selection of the Informants

Selection of appropriate informants was the first task
for the present research. These informants were the native
speakers who furnished us with the samples of the language
under study, how the utterances were used and what they
meant.

A total of 5 informants were selected for the
collection of the data. These informants were mostly women
workers (artisans or skilled labourers) belonging to the
lower strata of the Urdu speaking community. The informants
belonged to diverse areas of crafts and skills, as a result
of which we were able to collect a large number of words
from them related to their different areas of work.

For the present study only illiterate persons were
selected, lacking any kind of formal education. The basic
informal education they possessed was manifest in the
knowledge of Urdu alphabets and the reading of the Holy
Quran. As far as their income, occupation, education,
cultural possession and intellectual stimulation was
concerned, they belonged to the lower social class.
It is to be noted that all the informants were natives of Lucknow belonging to different Muslim localities. Their speech is a representation of the typical dialect of Lucknow. They were linguistically unsophisticated with clear pronunciation and audible voices.

The names of the informants and their respective ages are as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muneer Jehan (MJ)</td>
<td>50 years</td>
</tr>
<tr>
<td>Qamar Jehan (QJ)</td>
<td>45 years</td>
</tr>
<tr>
<td>Mana Begum (MB)</td>
<td>50 years</td>
</tr>
<tr>
<td>Hajra Khatoon (HK)</td>
<td>28 years</td>
</tr>
<tr>
<td>Azam Khan (AK)</td>
<td>45 years</td>
</tr>
</tbody>
</table>

Out of the 5 informants, 4 were females and 1 was a male. They largely, represented, older age group with the exception of one, who though young was competent enough to provide us with the required data.

Section B1(b): Data Collection

The data collected for the phonological study of Lucknow Urdu is based on face to face interviews running into hours. The data collection process has employed only those informants who were selected for the study and no one from outside.
The data collected can be divided into two parts:

(i) **Non-Selective Collection of Data**

To begin with, all kinds of words, phrases and sentences were assembled without any reference to word list etc.

(ii) **Selective Collection of Data**

By selective collection we refer to the collection of the monosyllabic words. This task was done in two ways. Firstly, by using J.T. Platts', Dictionary as a guide to the possible monosyllabic words in Lucknow Urdu. Secondly, by keeping in view the potential slots in the graph based on combination of all the phonological units, plotted both vertically and horizontally, for actual realization of the words.

The data was recorded in phonetic transcription, which tried to capture every phonetic detail of the sounds of Lucknow Urdu. The list of the monosyllabic words is carefully made to be as exhaustive as possible.

**Section B2: Procedures for the Analysis of the Data**

Analytical procedures used for setting up phonological units in the present study, were almost the same that are utilized in the discovery procedure for the inventory of phonemes by the phonemicists of the American Structuralist School.
The phonological analysis undertaken here, however, demanded procedures which would facilitate an exhaustive collection and analysis of the data. As mentioned above, the exhaustive monosyllabic data was collected through fieldwork.

The analysis of the data was done by plotting the monosyllabic words on the graph sheets. The CVC words were plotted, each of which contained all the words realized with one initial consonant, followed by all the vowels vertically, and with all the final consonants horizontally. Additional graphics were employed to get figures for $C_1C_2$ consonant clusters, both initially and finally for the monosyllabic words.

The departures from randomness were then tabulated for use in quantitative validation of the phonological analysis of Lucknow Urdu, presented in this thesis.

Section C: Theoretical Background*

Throughout the thesis, we have taken the liberty to incorporate ideas from both the published and unpublished works of Professor William Diver. It has often been impossible to give proper references in view of the extensive incorporation of his ideas in pieces. We are indebted to him for utilizing his concepts throughout the thesis. Any misinterpretation of his ideas does not imply that Professor Diver is responsible for it in the present work.
in this thesis is based on the phonological principles of Form-Content Linguistics. Although, the first linguist to sow the seed of this linguistic theory was Ferdinand De Saussure, it was reared and nurtured into a full-fledged branch by Professor William Diver of Columbia University. Professor Diver has also been influenced by Professor Andre Martinet. But the present form of this theory was fully developed by the scholars at Columbia University. The chain of development of this theory is a direct descent from Saussure to Prague School and from there by way of Andre Martinet to the successors at Columbia University. The five sections to follow give a brief account of this phonological theory. Section-C1 presents the orienting principles for the phonological analysis. Section-C2 contains discussion on the phonological and grammatical linguistic units. Section-C3 is comprised of the concept of double articulation of language as a parameter for distinguishing phonology from grammar. In Section-C4, we deal with the substance and value in linguistic analysis. Finally in Section-C5, we discuss the syntagmatic and paradigmatic aspects. We may take each section individually now.

Section-C1: Orientation, Theory and Phenomenon: Linguistics as a Discipline

The discipline of linguistics is regarded as a
tripartite organization by Form-Content linguistics. This tripartite organization consists of the following:

a) **Orientations**: are the common facts about the character of language which serve as external control on hypothesizing.

b) **Theory**: deals with the explanation of the non-random characteristics of phenomena by postulating hypothesis.

c) **Phenomena**: are the observable facts of the language.

The explanatory link between the orientations and the phenomena are provided by theory. The phenomena, i.e., the speech sounds follow a set pattern or in other words, they depart from randomness. The theory explains this non-random characteristics of the phenomena. The orientations act as justifications for the theory.

**Section C2: Orienting Principles**

Orienting principles or orientations are the facts related to the character of a language, which serve as external constraints or control over hypothesizing.

The Form-Content Theory introduced in this thesis, consists of five orienting principles, namely (i) physiological mechanism (physiology of the vocal tract), (ii) human behaviour (psychology), (iii) communication, (iv) acoustic medium, and (v) vision.
Thus, we can say that Form-Content Linguistics is an explanatory theory which takes into account the above mentioned five orienting principles as an actual basis for analytical work. The phonological theory of a language (or dialect) must be motivated by all the five orienting principles. We have made an attempt to outline each orienting principle in our subsections as follows:

Section C2(a): Physiological Mechanism

Physiological mechanism as an orienting principle emphasizes that the signals (encoded in articulatory gestures) of a language or languages are produced by a particular medium, the vocal tract. Thus, the characteristics of the vocal tract and the dynamics of sound production greatly affect the phonology of language. The various aspects of sound production (physiology of the vocal tract and the mechanism of the production of sound), thus serve, as a base for the phonology of language.

The impact of the human physiology on the study of speech sounds, has been emphasized by Professor Diver in the form of this first orienting principle – the physiological mechanism. The characteristics and limitations of the human vocal aperture in the production of speech sound is well explored by Professor Diver. It is to be noted that sound or
sound sequences, are often replaced by an alternative class of sound or sound sequences, identical to the changed sound or sound sequences, but lacking the difficult properties. The purpose of such changes and substitutions are thus to maximize the perceptual characteristics of speech and to minimize its articulatory difficulties.

Humans are endowed with a sophisticated sound producing mechanism. This helps them to produce larger number of sounds by the manipulation and configuration of the vocal tract.

The asymmetry of the vocal tract affects the production of speech sounds because there is comparatively more space at the front than at the back.

The different degrees of configuration of the vocal tract affect the production of sounds or phonological units. The individual units are classified on the basis of their varying degrees of apertures. In Section-C2(ai) and Section C2(aii), we deal with the articulators and the degrees of apertures respectively. In Section-C1(aiii), we discuss and present the hierarchy of the adroitness of the lingual articulators with defacto placement of the labium on the scale of hierarchy.

Section-C2(ai): Articulators

In this section, we will be discussing the
physiological characteristics of the articulators to determine their role in the production of speech sounds.

In the phonemic inventory of the traditional American structuralists, the consonants are classified or rather named depending upon their points of articulation such as "dentals", "velars" etc. However, the consonants and vowels are classified on the basis of the articulators in a phonological grid. The articulators are adroit members of the vocal tract and hence can be manipulated to affect the production of speech sounds. The shaping and excitation of the oral cavity for the production of speech sounds is brought about by these adroit articulators. When compared with the articulators, the points of articulation play a passive role in that they may be touched by the active articulators or an approximation be made towards them, by the articulator.

The lips, the tongue (apex, medium, front-dorsum, back-dorsum and post-dorsum), the velum and the larynx are the adroit members of the vocal tract which shape and excite the oral cavity in the production of speech sounds.

We may discuss the adroit members or the articulators one by one below:
The Lower Lip:

The lips are muscular structures which are advantageous in the sense that they can be watched by the listener.

The lower lip is the mobile of the two lips, for it is attached to the lower jaw. The lower lip comes in contact with the upper lip to form a complete closure, which is ideally suited for the production of stops. It also articulates against the edges of the upper-teeth, resulting in partial closure, which is an ideal situation for the production of traditional "fricatives".

The upper lip acts as an articulator for the labial stops like (p,b. etc) and the labial fricatives. The two rounded and protruded lips act as articulators to shape the oral cavity for the production of the labio-dorsal semi-vowel (w) and the labio-dorsal rounded vowels (u:, o: etc.).

The Tongue

The tongue as an articulator is of prime importance due to its physiology, adroitness etc. The complex muscular structure of the tongue can be divided into five parts, namely; the apex, the medium, the front dorsum, the back dorsum and the post dorsum or the root of the tongue.

i) Apex: The apex of the tongue is the tip of the tongue. This extremity of the tongue is very flexible. It moves
freely and can be moved to every nook and corner of the mouth. Due to its extreme flexibility and adroitness the tongue comes in contact with at least three places of articulation, namely, teeth, alveolar ridge and palate, to produce apico-dental, apico-alveolar, and apico-palatal (traditional retroflex) consonants.

The apex articulates against the edges of the upper teeth to produce the traditional 'dental' stops, (such as Urdu t, d, s, z). It also articulates against the alveolar ridge to produce the alveolar consonants (such as Urdu l, r, etc and English t, d). The apex comes in contact with the palate (hard palate) to produce apico-palatal (traditional 'retroflex') consonants, such as Urdu ट, ठ, ड, ढ.

ii) Medium: The medium of the tongue is the part which normally lies opposite the palate (hard palate). The medial (traditional palatal) consonants (c, j etc.) are produced by the articulation of the medium of the tongue against the palate.

iii) Front Dorsum: The front dorsum is that part of the tongue which lies behind the medium and falls opposite the pre-velum (upper part of the velum). The articulation of the front dorsum against the pre-velum results in the production of the front dorsal consonants, k, g etc (traditional 'velars') and the front dorsal (traditional "central
unrounded") vowels, such as a and a.

iv) Back Dorsum: The back dorsum is that part of the tongue which falls between the post dorsum (root) and the front dorsum and which lies opposite the post-velum (lower part of the velum). The back dorsum articulates against the post-velum to facilitate the production of the back rounded vowels (u:, o: etc.).

v) Post Dorsum or the Root of the Tongue: The post dorsum or the root of the tongue is the base of the tongue which is the place where the tongue is fixed in the oral cavity. The Arabic and Urdu traditional 'Uvular' consonant (q) is produced by the articulation of the post dorsum against the uvula.

The ancient Indian phoneticians had a tripartite division of the tongue parts. The three terms used by them are, the jihvā mula, 'root of the tongue', the jihvā-madhya, 'middle of the tongue', and the jihvāgra, 'tip of the tongue' (Allen; 1965: 18).

The Velum

The velum is a boneless muscular arch capable of independent movement up and down (Bloch B and Trager G.L.; 1942: 15).

The velum is not only a place of articulation, but it also acts as an articulator. Due to its flexible
musculature, the velum can open and close the passage to the nose. The nasal consonants and the nasal vowels are produced through the opening of the nasal cavity by the velum. The velum closes the nasal cavity to produce the oral consonants and vowels.

It is to be noted that, the flexibility or the adroitness of the velum is limited to only two apertures of opening, namely, \( \emptyset \) and approximating aperture 3 in the oral cavity.

Velum can be divided into two parts, namely, (i) pre-velum, which lies opposite the front dorsum of the tongue and is in continuation with the palate and, (ii) the post-velum which lies between the pre-velum and the uvula, right above the back dorsum of the tongue (Brosnahan and Malmberg; 1976: 39).

The Larynx

The larynx is comprised of three main parts, namely, the thyroid cartilage, the arytenoid cartilage and the vocal cords or the vocal folds.

(i) The thyroid cartilage is the most important of the cartilages in the larynx which forms a shield like structure (the 'Adam's Apple') on the front side of the larynx. It is open on the dorsal side (Brosnahan and Malmberg; 1950: 15-31).
ii) The arytenoid cartilages are two pyramid shaped cartilages fastened to the upper surface of the cricoid cartilage by means of joints which permit them to move laterally on it (Brosnahan and Malmberg; 1950: 15-31).

iii) The vocal folds or the glottal articulators originate at the anterior arms of the arytenoids (vocal processes) and is the most adroit of all the articulators.

Vocal folds are two parallel transverse bands or bands of muscle extending back from thyroid cartilage (Bloch and Trager; 1972: 16).

Due to its sensitive edges and its high flexibility, it is superimposed over the supraglottal articulators to produce many variations in consonants and vowels. The vocal folds undergo certain mechanism which are as follows:

a) When two vocal folds come in close contact, they make a temporary closure at the glottis, giving us a speech sound, known as "glottal stop".

b) The vocal folds are drawn apart when they are at rest, which is an ideal position for breathing and also for producing the voiceless sounds, b,d,j,g, etc.

c) The extreme sensitivity and flexibility of the vocal folds can produce various degrees of musical notes, called 'tones' as is apparent in Tone languages.
d) When the two vocal folds show a narrowing, with or without voicing, it produces aspirated sounds like ph, bh, kh, gh, etc.

Section C2(aii): Apertures

In the preceding section we discussed the role of the articulators in the production of speech sounds. Here, we shall discuss the various degrees of apertures, which is also an axis of the vocal tract, that produces speech sounds in combination with the articulators.

The degrees of aperture are reference points for the vertical closings and openings of the vocal tract (and of the glottis), resultants of the upward and downward movement of the lower jaw. We have divided this section into further sub-sections for ease of reference.

Degrees of Aperture

In this section, we describe the degrees of aperture, varying from total closure to maximum opening. Furthermore, we also throw light on the combination of individual apertures with the articulators to give us a variety of speech sounds, ranging from the stop consonants to the most open vowels.

Aperture-Ø: Aperture Ø(zero) refers to a complete closure of the airstream in the vocal tract.
The traditionally known 'stops' or 'plosives' are produced by the combination of the 0-aperture with the various articulators.

The various stops produced at 0-aperture are presented below:

- Labium : p b etc.
- Apex : t d etc, t̪ d̪ etc.
- Palatal : c j etc.
- Dorsum : k g etc.

Aperture-1: The obstruction of the airstream is partial at this aperture, as a result of which there is a turbulence produced by forcing the air through the contact point of the articulators and the points of articulation. Speech sounds traditionally known as 'fricatives' are produced at aperture-1. Also, it is important to note here that by the contact of the vocal cords on this aperture, voicing is produced, at the glottis.

We may illustrate the fricatives at aperture-1 as follows:

- Labium : f v
- Apex : e ə
- Glottis : V(voice)

Aperture-1 1/2 An unusual feature of Urdu is the use of an intermediate aperture at the glottis between aperture 1 and
2. As already seen, the glottis is used at aperture-1 in the production of what is usually called "voice" and at aperture-2 in the voiceless aspirates. The intermediate aperture, here called 1 1/2 a configuration of the vocal folds that is more open than that seen in voicing but less open than that seen in voiceless aspirates. The folds are in vibration first as they are in aperture-1, but the posterior section of the folds is continuously more open than in the case of plain voicing.

**Aperture-2**: There is no obstruction of the airstream at this aperture. The articulator, however, forms a sufficiently narrow constriction so as to control the airstream from the lungs in such a way that noise is produced by turbulence as the airstream comes in contact with some target.

Aperture-2 combines with various articulators to produce traditional 'fricatives' including the 'sibilants'. Furthermore, it may be mentioned here that aspiration is produced at this aperture.

The production of fricatives and of aspiration, at aperture-2 are presented below:

- **Apex**: s z
- **Front Dorsum**: š ž
- **Mid Dorsum**: x
- **Glottis**: A(spiration)
Apertures-3, 4, 5 etc.: The articulators produced resonant cavities at these successively larger degrees of aperture. Since the opening is very large at these apertures, there is no turbulence produced, the articulators only shape the cavity, whereas the excitation comes from the voicing at the glottis.

The traditional 'liquids', 'nasals', and 'vowels' are produced at these apertures.

In terms of the degrees of opening, aperture-3 can be placed between the small apertures (0 through 2) and larger apertures (4 through maximum opening). The narrow aperture-3 is ideally suited for liquids and nasals. It is however, unsuited for the production of vowels, which require a smooth, unobstructed flow of air stream.

Aperture-3 combines with the various articulators resulting in the production of 'liquids' and 'nasality', which is presented below:

<table>
<thead>
<tr>
<th>Labium+Back Dorsum</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apex</td>
<td>l r etc</td>
</tr>
<tr>
<td></td>
<td>l r rh etc</td>
</tr>
<tr>
<td>Front Dorsum</td>
<td>y etc</td>
</tr>
<tr>
<td>'Nasality'</td>
<td></td>
</tr>
<tr>
<td>Velum (at Aperture-3)</td>
<td>N(asality)</td>
</tr>
</tbody>
</table>
Velum (Aperture-3+Aperture-0) : Nasal consonants m n etc
Velum (Aperture-3 + Larger Apertures) : Nasalized vowels

Aperture-4 through most open aperture: These apertures are ideally suited for 'vowels' because they allow free outflow of air through the oral cavity.

Aperture-4 combines with appropriate articulators (of the three-part-dorsum), to produce 'close vowels' such as i and u. The greater the aperture the vowels become more open in quality, (Examples: e o; E o etc.) and the most open vowels such as a are produced at the largest aperture.

Traditional Equivalents of Apertures

A borderline is drawn between apertures 3 and 4. Thus apertures 0 through 3, associated with the production of consonants are placed in one division and the apertures 4 through the most open, concerned with the production of vowels are placed in the second division. This two-way division of apertures will correspond to the traditional division of consonants and vowels, in terms of openings and closings of the vocal tract.

From the traditional viewpoint, we can say that apertures 0 through 3 produce consonants and their
classification in comparison to the apertures is done in terms of manner of articulation like 'stops', 'fricatives', 'liquids', etc. On the other hand, the sounds produced at apertures 4 through most open, are the traditional 'vowels'. The classification of vowels is done in terms of height of the tongue raised such as "high", "mid", "low" etc. in traditional terms.

Our approach in classifying the speech sounds in terms of degrees of aperture is advantageous in that we apply a single uniform yardstick for both the consonants and the vowels.

Section C2(aiii): The Hierarchy of the Adroitness of the Lingual Articulators; Defacto Placement of the Labium

The tongue, which is made of muscular structures, is the most adroit among the lingual articulators. The light tapering structure of the tongue enables it to be moved to a number of points of articulation within the oral cavity.

The different parts of the tongue vary in their degrees of adroitness. The apex is not only the most adroit portion of the tongue, followed by the medium, front-dorsum, back-dorsum (the root of the tongue) in order of the hierarchy of adroitness, but it is most active among the supraglottal articulators.
It is to be noted that the musculature of the medium (front-dorsum) of the tongue is more closely associated with that of both the apex and the dorsum, than are the musculatures of those two with each other. Thus, it is clear that the adroitness of the apex and the dorsum is much higher than that of the medium. Moreover, the apex lies at the free end, hence, it can be maneuvered freely along the length and breadth of the oral cavity, whereas the rest of the tongue, particularly the medium is not so free.

It is to be mentioned here, that we have not taken into account any other supraglottal articulators, namely, the velum or the labium on the scale of adroitness.

The varying degree of the adroitness of the tongue, ranging from highest to the lowest is illustrated in Diagram 0-2.

Diagram 0-2: Scale of Adroitness of the Tongue Parts
It has been mentioned in the preceding section, that the hierarchy of the adroitness is limited to the tongue parts. We have not considered the labium or the velum here, among the supraglottal articulators.

As seen earlier, the lower lip is not only an important articulator, but is also adroit to a considerable extent. Thus, it would be worthwhile to make a defacto placement of the labium (lower lip) on the same scale of adroitness (Diagram 0-2) as that of the tongue. Given the musculature of the lower lip and the mobility of the lower jaw, we can definitely say that the labium occupies a place below the apex and above the medium, on the scale of adroitness. To be sure, the labium would occupy a place more or less near the dorsum of the tongue in terms of the hierarchy of adroitness.

Section C2(aiv): Size, Shape and Mass of the Lingual Articulators

Keeping in mind, the size, shape and mass of the various tongue parts, we can say that it plays a significant role in the shaping and excitation of the vocal cavity.

Since the apex is comparatively thin, less massy and narrow in size, it is the most adroit portion of the tongue and is best suited for the production of many consonants. However, although the apex plays an active role in the
production of consonants, its physiological makeup has repercussions on the production of certain sounds like vowels, where it has no role to play at all. The thin, tapering structure of the tongue fails to mould a proper resonating chamber, which is an essential feature for the production of vowels. Thus, we may claim that the more massy three part dorsum is ideally suited for the production of vowels and is at the same time instrumental in the production of certain consonants also.

Section C2(av): Role of the Larynx in the Production of Voicing and Aspiration

Urdu shows an unusual feature in that it uses an intermediate aperture at the glottis between apertures 1 and 2. It has been seen that the glottis is utilized at aperture 1 and 2 for what is called 'voice' and voiceless aspirates, respectively. The intermediate aperture, here called 1 1/2, is a configuration of the vocal folds that is more open than that seen in voicing, but less open than that seen in the voiceless aspirates. The folds are in vibration just as they are with aperture 1, but the posterior section of the folds is continuously more open than in the case of plain voicing.

The production of 'voice' and voiceless aspirates takes place at two natural positions. In contradistinction, the voiced-h projects an unnatural position of the vocal folds,
which can be shown in Diagram 0-3.

Diagram 0-3: Position of the Vocal Folds in the Production of 'Voice', Voiceless Aspirates and Voiced-h.

Section C2(b): Human Behaviour

Language is a particular instance of human behaviour, as a result of which it is highly influenced by the underlying characteristics of inherent human tracts like intelligence, laziness etc. The structuring and manipulation of language is to a great extent determined by these inherent human traits. As a result of these characteristics, human beings resort to a minimax solution between accomplishment and effort.

Language is a vehicle of communication. Human beings, being what they are, behave in a specific way in all situations which makes all human endeavors different from the performance of non-humans (animals, machines), language
being no exception. Human communication is different from other devices of communication, in that unlike mechanical devices, human communication does not require one to one correspondence between the message and meaning. Humans are endowed with physical and mental abilities of intelligence, memory, thinking, imagining and reasoning etc. Apart from these abilities, human behaviour is characterized by certain weaknesses like being inert, lazy etc.

Laziness is an inherent human trait, as a result of which humans save time and energy by leaving a lot unsaid in their communication and are still able to successfully get their message across to the hearer. The unspecified gaps in the message conveyed are inferred through human intelligence from the context or situation. Thus, human traits of laziness and human intelligence pave a path for economy and inference which in turn affect linguistic communication.

The traditional phonemicists, may find the concept of linking phonological analysis to human behaviour. However, it is an important orienting principle for us. Human behaviour as an orientation of Form-Content Linguistics, thus, affects the structure of a language and becomes an important consideration in the analysis of a language. Certain phonological skewings which are encountered in many languages are explainable through human behaviour. Some of these skewings are as follows:
(1) Preference of voiceless and unaspirated consonants over their voiced and aspirated counterparts. The concept of 'neutralization' is also a manifestation of this skewing. The rationale provided for such types of skewings are found in the human trait of favouring speech sounds produced by fewer articulators than those produced by more articulators.

(2) Sounds produced by an articulator at the nearest point of articulation are preferred over sounds produced by the same articulator at distant point of articulation.

(3) The characteristics of neighbouring segments tend not to be precisely differentiated. The assimilative trait can be seen in the combination of phonological units. The precise coordination is also evident by making certain phonological changes and making neighbouring segments similar. Keeping in view a general disfavouring of human beings for fine precisely coordinated movements, we may expect a favouring for such combinations of phonological units which share some feature of articulation.

(4) In successive segments large changes of aperture are preferred to small changes of apertures. Such changes are explained in terms of the human trait of aperture change and combination of phonological units.
Section C2(c): Communication

It is not novel to say that language is used for communication. Rather novelty lies in claiming that the very makeup and structure of the language are directly motivated by the act of communication.

Language is a particular instance of a system of communication, and like other systems of communication it indicates meanings by means of signals. In other words, language is a principle of classification with communication at its heart.

It has been agreed beyond doubt that communication is a basic factor in the structure of a language as far as grammar is concerned. The traditional phonemicists have argued for a long time whether communication has its domain in the phonology of a language or not. Andre Martinet was the first to introduce the role of meaning in phonology through his concepts of "functional load and functional yield". For us, however, communication plays an important role in the phonological analysis of language.

Communication, as an orienting principle, is of prime importance for us in that it plays a major role in the establishment of the phonological units in the phonological grid. The traditional American phonemicists believed in the
substitutional-distributional criteria, but resorted to meaning distinctions as a short-cut method. For us, we need not apologize for resorting to meaning for the establishment of the phonological units or traditional "phonemes", for communication is an orienting principle for the phonological analysis of any language. Thus, the phonological units of a language are established communicatively on the basis of distinctiveness in meaning.

Besides the makeup of phonological units, communication is also instrumental in the syntagmatic distribution of the phonological units. That is, the communicative load of various phonological units are not the same. Communicatively the initial position of the word is more important than the final position of the word. The communicative load is thus higher in word initial position than in word final position.

Phonological units with low communicative load are either wiped out or merge with other units which have higher communicative load. Trubetzkoy's concept of "neutralization" is one of the manifestations of communicative load in a language. Communication is thus at the epicenter of human language.

Section C2(d): Acoustic Medium

Language signals are transmitted through a particular medium, the acoustic medium. Recent researches in speech
science have shown that apart from articulatory properties, speech sounds also show certain specific and unique acoustic properties that correlate.

Acoustic medium as an orienting principle, is basically important in the study of vowels, where we deal with physiologico-acoustic features.

The human physiology dictates that the vocal tract is arranged symmetrically along one dimension. There is more space in the front than at the back within the vocal cavity. In the case of vowels, where the relative height (rise and fall of the tongue) is taken into account, the size of the resonance chamber matters a great deal. Bigger the chamber, more the sounds will be amplified.

Acoustically, it is easier to distinguish front vowels than the back vowels. The oral chamber for the front vowels extends from the medium to the larynx, as a result of which the sounds are greatly amplified.

However, for the back vowels, the resonance chamber extends from the dorsum to the larynx. Because of a comparatively small chamber, the vowels cannot be distinguished easily. An additional chamber is formed through lip rounding which amplifies the sound and hence makes them easily distinguishable.
This need for lip-rounding is clearly explanable through formants which are recorded by the sound spectrogram as a result of which we are able to distinguish the front vowels from the back vowels.

It is to be mentioned at this juncture, that our comments of acoustic medium are based on received knowledge.

Section C2(e): Vision

Language is an instance of the articulation of those organs that are visually observable.

Vision as an orienting principle has no role to play in the establishment of the phonological grid. The phonological grid of a language is governed by the other four orienting principles, namely, physiological mechanism, communication, human behaviour, and acoustic medium.

In the phonological analysis of language, we may encounter skewings where the use of the labial phonological units suddenly rise unexpectedly, such skewings can be explained through vision, which is one of our orienting principles.

Section C2(f): Summary Statements

To sum up the orienting principles as a whole we can
say that from the viewpoint of Form-Content Linguistics, the five orienting principles pertaining to the study of language can be defined as follows:

i) Phonology is a particular instance of the utilization as a sound-producing mechanism of the phonological characteristics.

ii) Phonology is to be regarded as a particular instance of vehicle of communication.

iii) Phonology is to be regarded as a particular instance of the learning capacity of humans.

iv) Phonology is to be regarded as a particular instance of acoustics.

v) Phonology is a particular instance of vision.

The quintuple orienting principles apply in totality to phonology. But only two principles, namely, communication and human behaviour are of direct consequence to the theory of grammar.

Section-C3: Linguistic Units

After introducing the five orienting principles for the phonological and grammatical analysis of a language, here, we present two types of units which are manifested in a
language. They are the phonological units and the signal-meaning units (or signes).

Phonology has for its basic unit the phonological units, while on the other hand, signes are the basic units of grammar. The phonological theory comprises of the postulation and the explanation of the phonological units or the articulatory gestures. The grammatical theory deals with the postulation and explanation of signal meaning units (signes).

All the five orientations, presented in Section-C2 apply to the makeup and non-random distribution of the phonological units. However, only two orientations are utilized in the establishment and non-random distribution of signes, namely, human behaviour and communication. To put it in other words, all the articulatory characteristics of the phonological units and their distribution within the word are motivated by all the five orientations, while signes utilize only two orientations mentioned above.

Section C4: Double Articulation of Language

The articulation of language on two different levels, as the name suggests, is termed as the double articulation of language. Andre Martinet developed this concept, which is one of the basic concepts that bifurcates Form-Content
Linguistics into grammar and phonology. Each of the signal meaning units which emerges from a first articulation is articulated in its turn into phonological units.

The first articulation of language is the articulation of experience into successive units, i.e. monemes, as Martinet refers to them. Human communications are analyzed into a succession of units each of which is endowed with a vocal form and meaning.

The second articulation of language refers to the phonic aspect of every moneme into a succession of distinct units, the phonemes. The signal meaning units are divided on the second plane into distinct articulatory gestures (phonological units). These phonological units or phonemes recur in different combinations to form the entire inventory of signals of the signal meaning pairs of a language.

Economy is basically the hallmark of the double articulation of language. The first articulation propagates economy in the sense that with a limited number of fairly unspecific signes, it was possible to create an infinity of different communications. If a system of communication is to be imagined which has a specific meaning attached to a specific signal, it would be a limited system of communication.

Just like the first level, the second level of
articulation leads to a lot of economy. This economy is seen in the fact that any particular phonological unit (phoneme) does not occur in simply one situation, but in many combinations. Because of the economy at the second level of articulation, only a handful of distinctive phonological units are needed for language to be conveyed in totality.

To sum up, we can say that the concept of double articulation, the brain child of Andre Martinet, is one of the basic concepts through which distinction is made between phonology and grammar in the analysis of language. Although some of the details pertaining to the double articulation, particularly with regard to grammatical analyses, are not relevant in the study of language in terms of the study of language in terms of the Form-Content Linguistics, the concept is very important for this theory. The phonology explains the non-random distribution of articulatory gestures in the formation of morphological signals. The grammar explains the non-random distribution of morphological signals.

Section-C5: Substance and Value in Linguistic Analysis

Substance and value are equally important in a linguistic analysis. Both substance and value play a role in the establishment of phonological units and signes, discussed in Section-C3.
The last quarter of the nineteenth century was an era of diametrically opposed views of the neo-grammarians who counted solely on substance and that of Saussure who took into account value consideration only. It was Andre Martinet who ventured out to weigh both substance and value on equal scales. He emphasized upon the concept that neither substance nor value alone could be considered in linguistic analysis. The ideal situation is when both are given an equal weightage in linguistic analysis.

The phonological units are classified on the basis of articulators and apertures in terms of physiological mechanism. In other words, the units are classified on the basis of their phonetic substance in the phonological grid. On the other hand, the phonological units also show the value interrelationship in the grid.

It should be noted here that it is not just distinctions, but also substantive difference that count in establishing linguistic signes. The value, then, is the statement of the distinctness of the meanings, of their number and of their interrelationships, it is the pattern in which the meanings are projected on the substance (Azim; 1978: 27).

As mentioned earlier, the Indo-Europeanist did all
their analysis on the basis of substance alone. As a reaction to this, Saussure propagated the concept of value in grammatical analysis. He highlighted value at the cost of substance.

The Prague School however, incorporated in their phonological works, the value relationship (restricted to grammatical analysis by Saussure). In fact, the paradigmatic axis of the Prague School phonology is based on Saussure's associative relationship (cf. Section C6).

Section C6: Syntagmatic versus Paradigmatic Relations

The syntagmatic versus paradigmatic relations for linguistic units is an important dischotomy.

The concept of syntagmatic versus paradigmatic relations was developed by Trubetzkoy of the Prague school of Linguistics, particularly for phonological analysis. But the dichotomy, under the terms "syntagmatic versus "associative" relations was actually introduced with particular reference to grammar and lexicon by Ferdinand de Saussure, the father of the modern Linguistics (Saussure; 1959: 122-123).

According to Saussure, everything is based on relations in a language state (synchrony). On the other hand, in
discourse, words acquire relations based on the linear nature of language because they are chained together. This rules out the possibility of pronouncing two elements simultaneously. The elements are arranged in sequence on the chain of speaking. Combinations supported by linearity are syntagms. The syntagm is always composed of two or more consecutive units. In the syntagm, a term acquires its value only because it stands in opposition to everything that precedes it or follows it, or to both (Saussure; 1959: 122-123).

Outside discourse, on the other hand, words acquire relations of a different kind. Those that have something in common are associated in the memory, resulting in groups marked by diverse relations. The coordination formed outside discourse are not supported by linearity. Their seat is in the brain, they are a part of the inner storehouse that makes up the language of each speaker. They are associative relations (Saussure; 1959: 122-123).

Saussure’s concept of “associative relation” was derived from his concept of “value”. It may however be noted that his dichotomy of syntagmatic and associative relations was limited to only the level of grammar and lexicon.

After Saussure, Trubetzkoy took up this concept and
developed it further. It was he who extended the application of Saussure's dichotomy to the level of phonology. And it was he who used the term "paradigmatic" for Saussure's "associative relation". According to Trubetzkoy, the syntagmatic relationship of the units (grammatical and phonological) represents the interrelationship of the units in the speech chain or in the syntagm, whereas the paradigmatic relationship refers to the interrelationship of the units in a paradigm. In the case of phonological units, the paradigm is the inventory or the repertory of phonological units in a language.

Andre Martinet, who follows Trubetzkoy, also holds the same view with regard to the syntagmatic versus paradigmatic relations in phonology. Moreover, he introduced a third relation, namely, "functional relation" for phonological analysis. He was the first scholar to recognize that "function", i.e., communication plays a role in phonology.

Thus, we see that as far as the concepts of syntagmatic, paradigmatic and functional relations are concerned, there is a direct line of scholarly descent from Saussure to Prague School, and from there to Columbia school through Andre Martinet.

In the present phonological analysis, both the
syntagmatic and the paradigmatic relations have been considered.

Section C7: Validation of the Analysis

The theoretical framework, consisting of the five orienting principles, namely, physiological mechanism, human behaviour, communication, acoustic medium, and vision, have to be utilized to provide justification of the analysis.

The comparison of the data collected with the phonological principles of the theory is referred to as the validation of the theory. In general, the theory provides for a statement of the methods of sound production in terms of a phonological grid and principles that restrict or encourage the potential utilization of the members of the grid in the formation of morphemes. In the comments on the grid and on the frequency counts detailed comparisons will thus be made at every point between the data and the principles. This will be done primarily by reference to the skewed characteristics readily observable in the data, since the point of validation is a demonstration that the skewings are produced by the phonological principles themselves.

Section C8: Scope of the Study

The present phonological analysis of Lucknow Urdu is limited in scope, both in the collection and utilization of
data and in the presentation or application of the orienting principles for phonology.

The data utilized in the frequency counts is limited to only monosyllabic words in Lucknow Urdu. We have occasionally used some polysyllabic words collected randomly during field-work.

The phonological analysis of Lucknow Urdu is limited in the application of the five orienting principles. Whereas the phonological analysis presented here is carried out in terms of all the five orienting principles, it must be pointed out that the analysis is limited in terms of the orienting principles of acoustic medium. The analysis in terms of this orienting principle is based on received knowledge on acoustics. However, we have made some observations in terms of acoustic medium, that tend to reinforce our phonological analysis arrived at through physiological mechanism.