Classification of English speech sounds

Two major classes of sounds

- consonants
- vowels

- **auditory effect**

consonants → voice and noise combined,
vowels → voice only

- **articulatory point of view**

consonants → various obstructions are made,
vowels → no obstruction is made

.

Consonants

- a complete, partial or intermittent blockage of the air passage
- the air stream is blocked or hindered or otherwise gives rise to audible friction

→ sounds which have noise

- The phonological analysis of English consonant sounds helps to distinguish 24 phonemes:

  [p, b, t, d, k, g, f, v, θ, ð, s, z, ʃ, ʒ, h, tʃ, dʒ, m, n, ŋ, w, r, 1, j].

Articulatory classification of English consonants

The particular quality of a consonant would be best thought of as a complex bundle of features

- articulatory posture
- place in the mouth
- organ makes an obstruction
- work of vocal cords, etc.

Articulatory classification of English consonants

Each sound is known to have three aspects:

- acoustic,
- articulatory,
- auditory

→ can be studied on these three levels.

Articulatory classification of English consonants

Russian phoneticians classify consonants according to the following principles:

- degree of noise;
- place of articulation;
- manner of articulation;
- position of the soft palate;
- force of articulation.

The primary importance → **the type of obstruction and the manner of production of noise**.

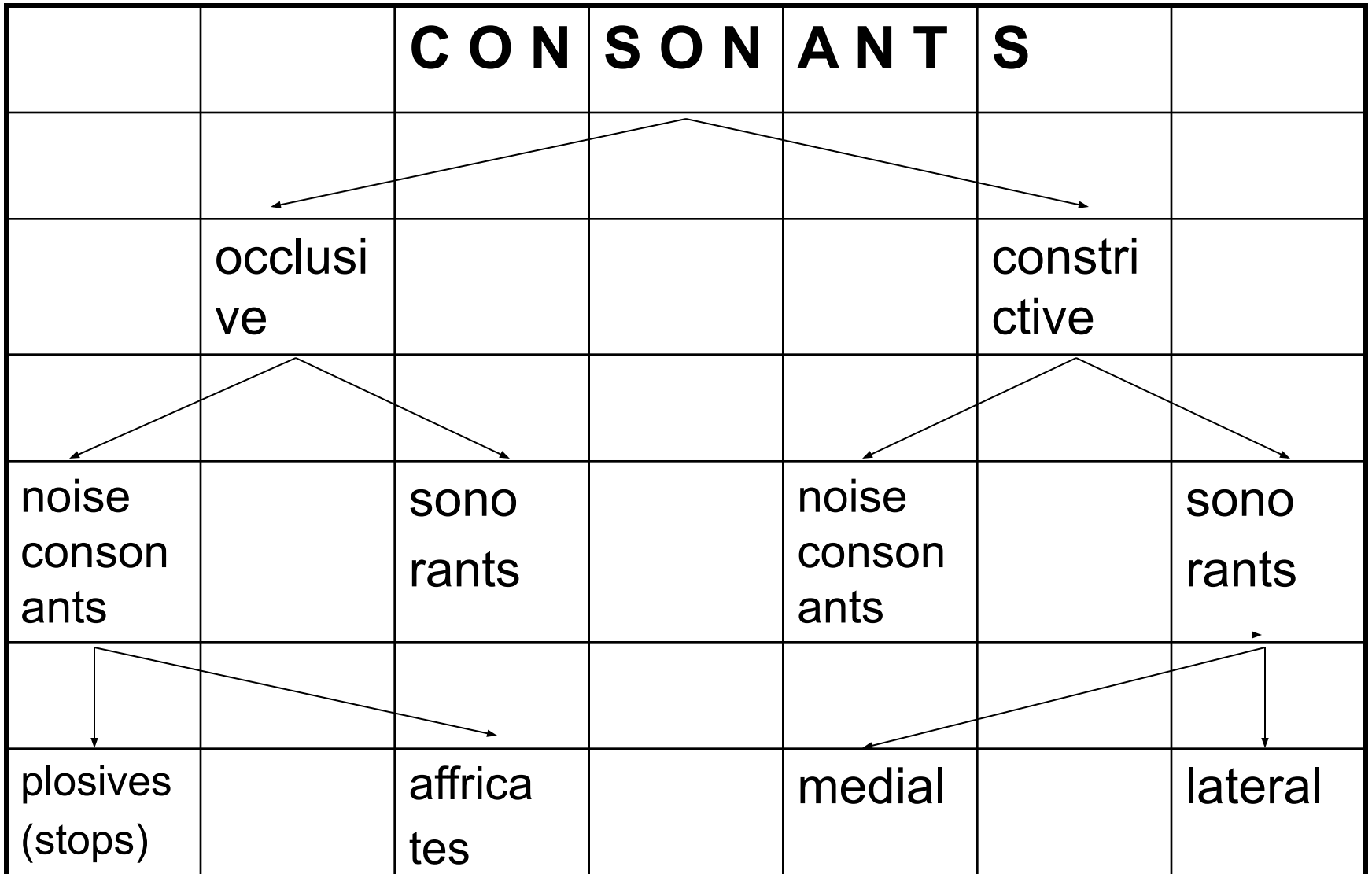
Two large classes of consonants:

- a) occlusive, in the production of which a complete obstruction is formed;
- b) constrictive, in the production of which an incomplete obstruction is formed.

- [ti:] - [si:] tea - sea (occlusive - constrictive)
- [si:d] - [si:z] seed - seas (occlusive - constrictive)
- [pul] - [ful] pull - full (occlusive - constrictive)

- Each of the two classes is subdivided into noise consonants and sonorants ← either noise or tone component prevail in the auditory characteristic of a sound.
- Noise consonants are divided into plosive consonants (or stops) and affricates.

lateral


C O N S O N A N T S
occlusive
constrictive
noise consonants
sonorants
noise consonants
sonorants
plosives (stops)
affricates
medial
lateral

Another point of view

- is shared by a group of Russian phoneticians.
- The first and basic principle of classification - the degree of noise.
- Such consideration leads to dividing English consonants into two general kinds:

a) *noise consonants*;

b) *sonorants*.

“Degree of noise"

- The term belongs to auditory level of analysis.
- There is an intrinsic connection between articulatory and auditory aspects of describing speech sounds.
- In this case the term of auditory aspect defines the characteristic more adequately.

Sonorants

- differ greatly from other consonants.
- In their production the air passage between the two organs of speech is fairly wide.

→ the auditory effect is tone, not noise

→ sound more like vowels than consonants

[r], [j], [w]

- the class of semivowels
- Acoustically sonorants are opposed to all other consonants because they are characterized by sharply defined formant structure and the total energy of most of them is very high.

Functional grounds

- according to their position in the syllable → consonantal category
- from the point of view of their phonetic description → vowel glides

According to the Soviet phoneticians

- sonorants = consonants from articulatory, acoustic and phonological point of view
- sonorants can be classified according to all the principles of classification of consonants:

  [beɪk - meɪk] bake - make (noise consonant - sonorant)

  [vi:l- wi:l] veal - wheel (noise consonant - sonorant)

Classifications of British and American scholars

- no sonorants
- Daniel Jones and Henry A. Gleason – separate groups of nasals [m, n, ŋ], the lateral [l] and semi-vowels, or glides [w, r, j].
- Bernard Bloch and George Trager – nasals, lateral + trilled [r].

The manner of articulation

The point of view of the closure:

- complete closure → occlusive (stop or plosive) consonants
- incomplete closure → constrictive consonants
- the combination of the two closures → occlusive-constrictive consonants, or affricates
- intermittent closure → then rolled, or trilled consonants

Russian phoneticians

Consonants:

- unicentral (pronounced with one focus)
- bicentral (pronounced with two foci)
- according to the number of noise producing centers, or foci.

The shape of narrowing

Constrictive consonants and affricates:

- sounds with flat narrowing
- sounds round narrowing

The place of articulation

- is determined by the *active organ of speech against the point of articulation*. According to this principle the English consonants are classed into:
- labial,
- lingual,
- glottal.

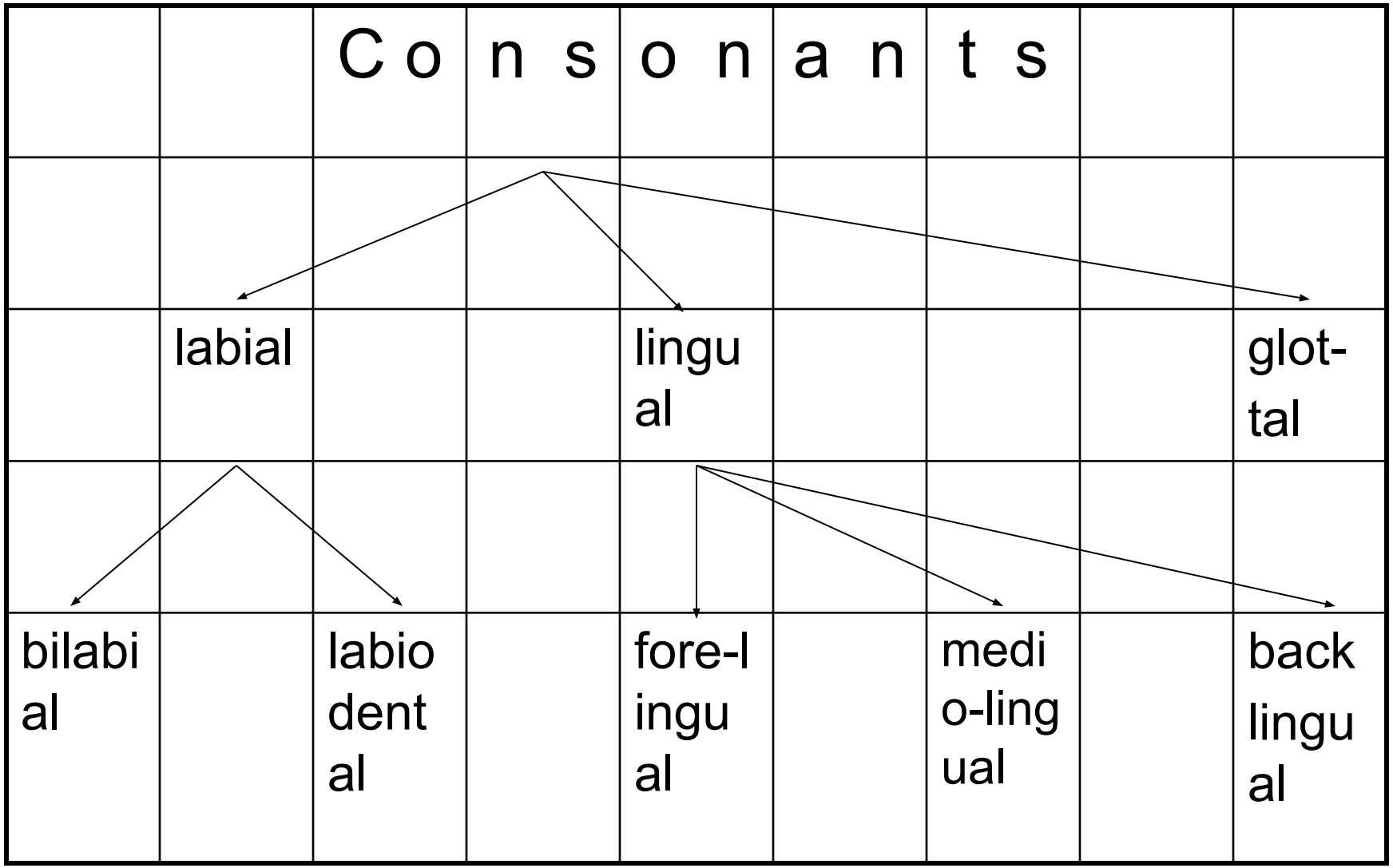
The class of labial consonants

- bilabial;
- labio-dental

The class of lingual consonants

- forelingual,
- medio- lingual,
- backlingual.

back
lingual



Oppositions

based on the active organ of speech and the place of obstruction

- [waɪ] - [laɪ] why - lie (bilabial - forelingual)
- [pɪk] - [kɪk] pick - kick (bilabial -backlingual)
- [saɪ] - [haɪ] sigh - high (forelingual - glottal)
- [les] - [jes] less - yes (forelingual - mediolingual)

Voiced - voiceless characteristic

- depends on the work of the vocal cords
- [p, b], [t, d], [k, g], [s, z], [f, v], [ʃ, ʒ], [ʧ, ʤ] → absence or presence of vibrations of the vocal cords, voice or tone component
- There is also energy difference (force of articulation) → all voiced consonants are weak **(lenis)** and all voiceless consonants are strong **(fortis)**

Controversy

- In the intervocalic position the voicing difference is important

  latter – ladder

- In word-initial and final positions the pronunciation of consonants traditionally considered to be voiced may well be voiceless

  cap – cab, not – nod

Controversy

- In initial position aspiration would be a more important feature for stops

  tick – Dick, cap – gap

- In a word-final position the length of the proceeding vowel constitutes the chief difference

  bead – beet

↓ ↓

- the presence or absence of voice is not a constant distinctive feature

→ oppositions [p, b], [t, d], [k, g], [s, z], [f, v], [ʃ, ʒ], [ʧ, ʤ] are primarily based on energy difference → on ***fortis - lenis*** articulation

The position of the soft palate

- oral
- nasal
- When the soft palate is raised → oral consonants
- When the soft palate is lowered → nasal consonants

Nasalization

- cannot be a phonologically relevant feature of English consonants → no differences of meaning in the presence or absence of nasalization

→ it is an indispensable concomitant feature of English nasal consonants.

Distinctive oppositions of English consonants

Degree of noise

bake - make, veal - wheel

Place of articulation

– labial vs. lingual

pain - cane

– lingual vs. glottal

foam = home, care - hair, Tim - him

Distinctive oppositionsof English consonants

Manner of articulation

- occlusive vs. constrictive

  pine - fine, bat - that, bee – thee

- constrictive vs. affricates

  fare - chair, fail – jail

- constrictive unicentral vs. constrictive bicentral

  same – shame

Distinctive oppositions of English consonants

Work of the vocal cords and the force of articulation

voiceless fortis vs. voiced lenis

pen - Ben, ten - den, coat - goal

Position of the soft palate

oral vs. nasal

pit - pin, seek - seen

The problem of affricates

- their phonological status? their number?

  What kind of facts a phonological theory has to explain?
- Are [tʃ, dʒ] monophonemic entities or biphonemic combinations (sequences, clusters)?
- If they are monophonemic, how many phonemes of the same kind exist in English → can such clusters as [tr, dr] and [tθ, dð] be considered affricates?

The problem of affricates

[tʃ, dʒ] are complexes ← articulatory distinguish two elements.

phonemic duality of affricates → necessary to analyze the relation of affricates to other consonant phonemes

↓ ↓

define the status of affricates in the system

The type of obstruction

- complete
- incomplete

→ affricates cannot be referred to either of the groups, since they consist of both:

the closure and the narrowing

↓↓

single out a group of affricates, or occlusive-constrictive consonants

Controversy

- Russian specialists – are two affricates in English: [tʃ, dʒ].
- D. Jones – six of them: [tʃ, dʒ], [ts, dz], and [tr, dr].
- A.C. Gimson – [tʃ, dʒ], [ts, dz], [tr, dr] + [tθ, tð].

Why such a difference in their opinions?

- Russian phoneticians → affricates through three aspects: articulatory, acoustic and functional (the most significant one)
- British phoneticians → primary concern is the articulatory-acoustic unity of these complexes (practical reasons of teaching English)

Articulatory indivisibility

N.S. Trubetzkoy - a sound complex may be considered monophonemic if:

- its elements belong to the same syllable;
- it is produced by one articulatory effort;
- its duration should not exceed normal duration of elements.

Syllabic indivisibility

butcher [butʃ -ə]
mattress [mætr-is]
curtsey [kɜ:-tsi]
eighth [eitθ]

lightship [lait-ʃip]
footrest [fut-rest]
out-set [aut-set]
whitethorn [wait-θo:n]

↓ ↓

[tʃ], [tr], [ts], [tθ] belong to one syllable
can't be divided into two elements
by a syllable dividing line.

Articulatory indivisibility

Special instrumental analysis shows that all the sound complexes are homogeneous and produced by one articulatory effort

↓ ↓

Articulatory indivisibility

- At the beginning of the articulation the organs of speech are in the position of the second fricative element [ʃ], [r], [s], [θ] or [ʒ], [z]
- but there is a complete obstruction (a closure) formed by the tip and the sides of the tongue against the alveolar ridge and the side teeth
- Then the closure is released and the air escapes from the mouth cavity, producing audible friction.

Duration

length of sounds depends on the position in the phonetic context → it cannot serve a reliable basis in phonological analysis.

length of English [tʃ] *chair* and *match* is different

[tʃ] in *match* is considerably longer than |t| in *mat* and may be even longer than [ʃ] in *mash.*

→ does not prove that [tʃ] is biphonemic.

- morphological criterion – monophonemic if a morpheme boundary cannot pass within it (morphologically indivisible)

↓ ↓

[tʃ], [dʒ] – a monophonemic status, since they are indispensable

[ts], [dz] and [tθ], [dð] – their last elements are separate morphemes [s], [z], [θ], [ð]

- [ts], [dz] and [tθ], [dð] do not correspond to the phonological models of the English language and cannot exist in the system of phonemes.

- The case with [tr], [dr] complexes is still more difficult.

Two approaches

- British phoneticians – eight affricates in English [tʃ], [dʒ], [tr], [dr], [ts], [dz], [tð], [dθ] *articulatory and acoustic point of view → the entities are indivisible*
- Russian phoneticians – [tʃ], [dʒ] are monophonemic units; [tr], [dr], [ts], [dz], [tð], [dθ] are biphonemic complexes *morphological and the phonological point of view*

↓

But ignores the articulatory and acoustic indivisibility